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# Plant Biology Personnel and Training at Doctorate-granting Institutions

**Charles J. Andersen**

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# HIGHLIGHTS

- Research support in plant biology totaled a little more than $200 million in fiscal year 1983. The federal government provided nearly half of these funds (48 percent); the state governments, about one-third (34 percent); and industry one-tenth (10 percent).
- Molecular biology was the discipline most frequently cited as having a shortage of personnel. Ecology was most frequently identified as the specialty that had a surplus of personnel.
- Ecology was the area of concentration that ranked highest for graduate study and faculty research. Plant physiology was ranked highest for postdoctorate research and/or study.
- Land-grant institutions predominate in all areas of academic plant biology. They account for 83 percent of the research support; 80 percent of the faculty, students, and doctorates, and 72 percent of the postdoctorates.
- Over 4,700 full-time plant biology faculty were in departments involved in training graduate students in the field at the nation's principal doctorate-granting institutions.
- Just over 8,000 full-time students were in graduate plant biology programs at major doctorate-granting institutions in fall 1982.
- The primary source of support for nearly one-third of the graduate students in plant biology came from the institutions themselves. Federal sources provided the primary support for nearly one-quarter of the students, state governments for one-eighth, and industry for less than one-tenth.
- Over 900 doctorates were awarded in academic year 1982-83 in disciplines that comprised plant biology.
- One thousand postdoctorate fellows or associates were studying and/or conducting research in plant biology during the 1982-83 academic year.

Women represented 31 percent of the graduate students, 29 percent of the postdoctorates, 21 percent of the doctorates awarded, and 7 percent of the faculty in graduate plant biology programs.

Members of racial/ethnic minorities comprised 4 percent of the faculty in graduate plant biology programs, and 5 percent of the doctorates awarded in 1982-83. Seven percent of the U.S. graduate students and 10 percent of the postdoctorates in plant biology in 1982-83 were racial/ethnic minority group members.

Foreign students with temporary visas represented 20 percent of the full-time graduate students and 33 percent of the postdoctorates in plant biology. Three-quarters (77 percent) of these foreign graduate students and two-fifths (39 percent) of the foreign postdoctorate fellows came from developing countries.

# BACKGROUND

Various recent studies and reports have emphasized the importance of plant biology research. In 1983, the National Academy of Sciences Briefing Panel on Agricultural Research Opportunities identified plant biology specifically as a research area that is likely to return the highest scientific dividends as a result of incremental federal investments. The National Science Board is devoting special attention to plant biology since it is expected to produce the scientific discoveries essential to agricultural advances in the next century.

Planning major research programs requires accurate information about funding and personnel. Reliable baseline data for plant biology have not been available. To develop such data, the National Science Foundation asked the Higher Education Panel to measure the total plant biology effort in terms of students, faculty, researchers, and research funding at those doctorate-granting institutions with graduate programs in the field. Though much activity in plant biology occurs at the undergraduate level, in this first effort to gather basic information, the decision was to focus on the major graduate institutions, where most of tomorrow's professoriate is prepared and where most of the research is being conducted.

# FINDINGS

These findings are national estimates based on responses from 143 of the 165 major doctorate-granting institutions that had graduate programs in plant biology in fall, 1982. A description of the data-gathering procedure is found in the Methods Summary section, which follows these findings, and in Appendix B, Technical Notes.

## Research Support

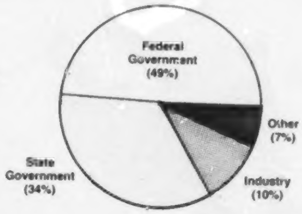
Research support totaling $201.6 million was received by the 165 doctorate-granting institutions covered by this survey. The federal government provided $98 million, or nearly half of that total. This 1983 federal contribution equals about one-twelfth of the federal research and development funds for the biological and agricultural sciences for 1982 as reported by the National Science Foundation.[1]

State governments provided just over one-third of the plant biology research support; industry provided one-tenth (see figure 1).

Figure 1

Sources of Research Support for Plant Biology, FY 1983

Total: $201 million



Four-fifths of these research support funds went to land-grant institutions. They received nearly all of the funds (98 percent) provided by the state governments, and three-quarters of those provided by the federal government, industry, and other sources.

## Faculty

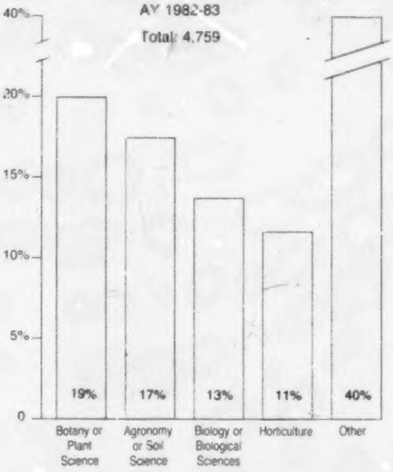
A total of 4,760 full-time plant biology faculty were in departments involved in training graduate students in the field. Nineteen percent of these faculty were in botany or plant science departments; 17 percent were in agronomy and soil science departments; 13 percent were in biology or biological science departments; and 10 percent were in horticulture departments. The remaining 40 percent of the faculty were spread among departments of plant pathology; forestry; plant and soil science; biochemistry; genetics; chemistry; marine sciences/oceanography; and other. None of these departments accounted for as much as 10 percent of the total faculty.

Figure 2

Plant Biology Faculty, by Department

AY 1982-83

Total: 4,759



Overall, about 8 of 10 plant biology faculty were directly involved in training graduate students. However, that proportion varied somewhat by department. In departments of botany or plant science, 83 percent of the faculty were teaching graduate students, in contrast to 71 percent in departments of plant and soil science and 73 percent in departments of horticulture and agronomy and soil science (see table A). Faculty in these departments are primarily at land-grant institutions, where research and extension are major activities.

TABLE A--Percentage of Plant Biologists Training Graduate Students, by Department, AY 1982-83

| Department | Percentage Training Graduate Students at All Institutions | Percentage Training Graduate Students at Land-grant Institutions |
|---|---|---|
| All departments | 81% | 79% |
| Botany/plant science | 83 | 81 |
| Biology/biological sciences | 83 | 81 |
| Plant pathology | 82 | 82 |
| Forestry | 79 | 79 |
| Agronomy and soil science | 73 | 74 |
| Horticulture | 73 | 73 |
| Plant and soil science | 71 | 69 |

Note: Only those department names with totals of more than 150 plant biologists are listed.

Reference: Table 2A

A total of 4,610 faculty were reported in the plant biology programs conducted at the 165 institutions covered by the survey.[2] Women represented 7 percent of this faculty. Members of minority racial/ethnic groups make up 4 percent of the total.

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[1] National Science Foundation (NSF), Academic Science R&D Funds, FY 1982, Detailed Statistical Tables (Washington: NSF, 1984).

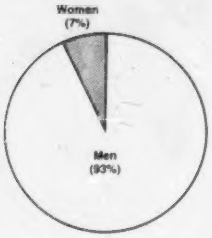
[2] The 3 percent difference between "departmental" and the "program" counts (4,759 vs. 4,607) may be due to the elimination from the latter of plant biologists in departments that were peripheral to some institutions' formal plant biology graduate programs.

**Figure 3**

Plant Biology Faculty by Sex

AY 1982-83

Total: 4,759



## Faculty Vacancies

Forty-one percent of the institutions reported at least one full-time faculty vacancy in their plant biology programs as of the fall of 1983. Nearly 215 vacancies were reported, or 4 percent of the departmental faculty count.

Eighteen institutions reported that molecular biology was the discipline in which the need to replace faculty was the greatest. Eight institutions identified horticulture/crop science as the neediest field; 7 noted agronomy/soil science; and 5, plant physiology. The remaining 29 institutions had faculty vacancies spread among various other disciplines, such as anatomy/ morphology; biochemistry; developmental biology; and plant pathology. None of these disciplines was cited by more than 4 institutions as being in greatest need of being filled.

Almost half of the institutions reporting vacancies identified research opportunities as being the most important reason for filling the vacancy(ies) in the discipline with the greatest need. Another one-third identified faculty retirements/ departures as the most important reason. Not known is whether institutions were using (as they sometimes do) the existence of a vacancy to take advantage of research opportunities in certain disciplines to fill a vacancy, rather than replacing a retiring faculty member in one discipline with another in the same discipline.

## Postdoctorates

In 1982-83, postdoctoral fellows or associates in plant biology numbered just over 1,000 nationally. Essentially the same number of postdoctorates (1,020) were expected in 1983-84.

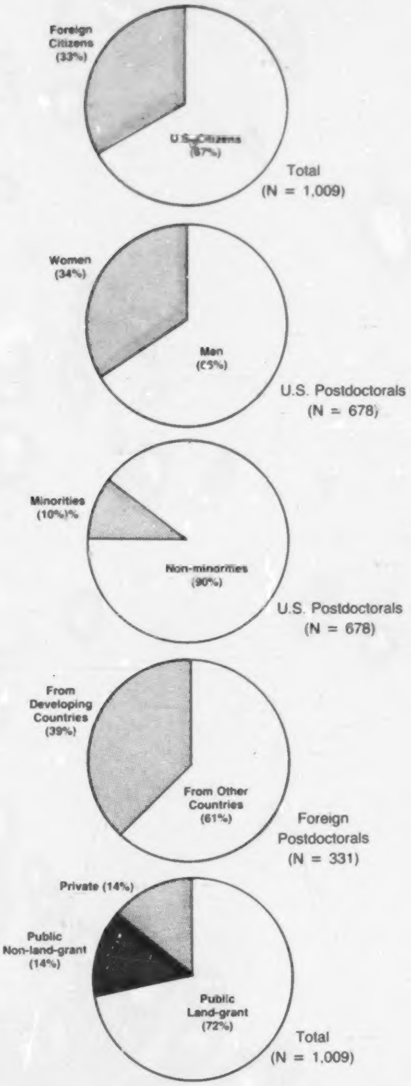
Two-thirds of the postdoctorates were U.S. citizens. Of these, 1 out of 3 was a woman; and 1 of 10 was a member of a racial/ethnic minority group.

One-third of the fellows were foreign citizens with temporary visas for the United States. Of these foreign postdoctorates, two-fifths came from developing countries.

**Figure 4**

Postdoctoral Fellows/Associates in Plant Biology

AY 1982-83



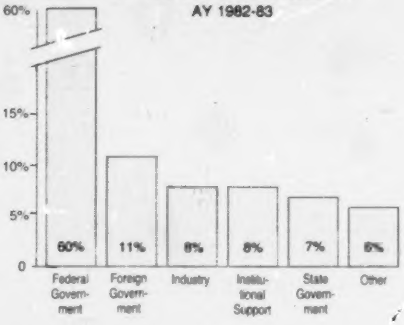
About three-quarters (72 percent) of the postdoctorates were at land-grant institutions. These colleges and universities had essentially the same share of all the foreign postdoctorates with temporary visas (75 percent) but a somewhat smaller share (65 percent) of the postdoctorates from developing countries.

Three of 5 postdoctorates in plant biology received their major support from the federal government--either through fellowship assistance or research grants. Foreign governments were the second most important source, providing support for one-tenth of all postdoctorates. If one assumes that foreign governmental assistance is confined to postdoctorates with temporary visas, then as many as a third of the foreign postdoctorates would have received their major support from foreign governments.

Industry and institutional support each provided major support to 8 percent of the postdoctorates; state governments, to 7 percent (see figure 5).

**Figure 5**

Sources of Major Support for Postdoctoral Fellows/Associates AY 1982-83



## Graduate Students

An estimated 8,000 graduate students were enrolled in plant biology programs in academic year 1982-83. About the same number were expected to be in these programs in the 1983-84 academic year.

U.S. citizens (and foreign nationals with permanent visas for the United States) made up four-fifths of this graduate enrollment. Two-thirds of these U.S. students were male; one-third were female; less than one-tenth were members of racial/ethnic minority groups.[3] Land-grant institutions enrolled 80 percent of all graduate students.

Twenty percent of the graduate students were foreign citizens with temporary visas. Seventy-seven percent of these were from developing countries, and 87 percent were enrolled at land-grant institutions.

The major source of support for 2,400 graduate students--30 percent of the total--came from their own institutions. Thus, institutional support predominated as the greatest source of graduate student support. The federal government--through fellowships or research grants--ranked second, providing support to 23 percent of the students.

Fourteen percent of the students were reported to derive their major support from personal funds, 12 percent from state governments, and 6 percent from industry.

Foreign governments provided the major support to 840 students, or 11 percent of the total. If one assumes all of these were foreign students, then foreign governments were the major source of support for 52 percent of all the foreign graduate students in plant biology.

**Figure 6**

Graduate Students in Plant Biology

AY 1982-83

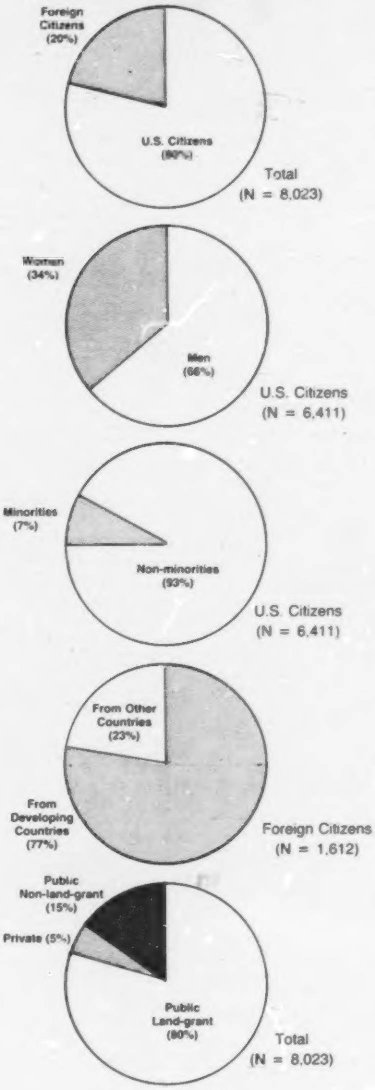
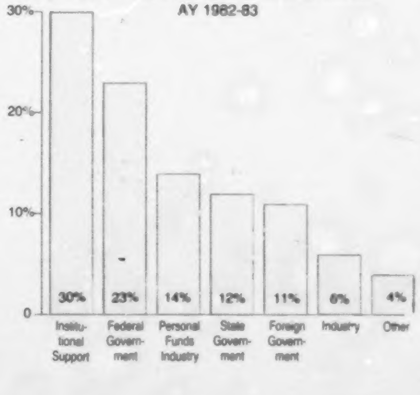


**Figure 7**

Sources of Major Support for Graduate Students

AY 1982-83



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[3] The Department of Education's Office of Civil Rights (OCR) reported that racial/ethnic minorities in 1980 comprised 9 percent of the U.S. graduate students in agriculture and natural resources and the biological sciences combined. Source: Rosa M. Simmons and Susan G. Broyles, Fall Enrollment in Colleges and Universities, 1980 (Washington: Government Printing Office, 1982).

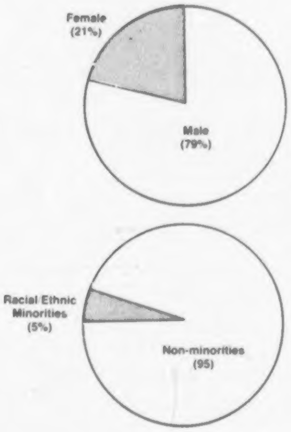
An estimated 925 men and women received doctorates in plant biology in academic year 1982-83. A 14 percent increase (to 1,050) was estimated for academic year 1983-84.

Women received 21 percent of the plant biology degrees, and members of racial/ethnic minority groups were awarded 5 percent of the total (see figure 8).[4]

**Figure 8**

Doctorates Awarded in Plant Biology, Academic Year 1982-83

Total: 925



## Areas of Concentration

Ecology was the discipline in which there was the greatest concentration in graduate student training and faculty research. Plant physiology and systematics showed the second and third highest degrees of concentration in these two areas of academic activity.

For postdoctoral research and training, however, the results were somewhat different. Plant physiology ranked first, with biochemistry and ecology holding the second and third places, respectively.

This ranking was determined by having the respondents list, in rank order, the 3 major disciplines that best characterized the areas of greatest concentration in their plant biology program(s).

A weighted score for each discipline was calculated by assigning it a value of 3 when it ranked highest, a value of 2 when it ranked second highest, and a value of 1 when it ranked third highest. The values were summed to get a total score for each discipline. The scores were summed and percentage distributions were calculated separately for (1) graduate student training, (2) postdoctoral research and training, and (3) faculty research (see table B).

TABLE B--Highest Ranking Areas of Concentration in Plant Biology, AY 1982-83

| Area of Concentration | Rank | Percent of Total Weighted Score |
|---|---|---|
| Graduate Student Training | | |
| Ecology | 1 | 20% |
| Plant physiology | 2 | 16 |
| Systematics | 3 | 11 |
| Agronomy and soil science | 4 | 8 |
| Biochemistry | 5 | 7 |
| Faculty Research | | |
| Ecology | 1 | 19% |
| Plant physiology | 2 | 18 |
| Systematics | 3 | 10 |
| Biochemistry | 4 | 7 |
| Agronomy and soil science | 5 | 6 |
| Postdoctoral Training and Research | | |
| Plant physiology | 1 | 21% |
| Biochemistry | 2 | 14 |
| Ecology | 3 | 11 |
| Plant pathology | 4 | 8 |
| Molecular biology | 5 | 7 |

Note: Graduate study and research are conducted in disciplines with low (or even no) scores. The low score indicates that few institutions have made the discipline a top priority.

Reference: Table 6

Each institution was also asked to indicate, for the discipline it ranked highest for graduate student training, those fields in which students were required to take courses, or to have taken courses as undergraduates. Detailed tables series 7 presents the results in the form of cross tabulations showing the number of institutions that ranked each plant biology discipline highest for graduate student study and the number of institutions that required courses in selected fields. Table C presents those data as percentages for the 5 top-ranked disciplines.

Of the 40 institutions that reported ecology as the top-ranked discipline for graduate student training, 49 percent required courses in biochemistry; 80 percent required coursework in genetics; 73 percent required courses in plant physiology; and nearly all required courses in ecology/evolution. Of the 17 institutions that reported the greatest concentration as being in plant physiology, all required their graduate students to have coursework in biochemistry; 88 percent required courses in genetics; and 82 percent required courses in plant physiology.

---

[4] The Department of Education's Office of Civil Rights (OCR) reported that racial/ethnic minorities in 1981 earned 6.5 percent of the doctorates awarded in agriculture and natural resources and the biological sciences combined. Source: W. Vance Grant and Thomas D. Snyder, Digest of Education Statistics, 1983-84, (Washington: Government Printing Office, 1983).

TABLE C--Required Courses, by Selected Graduate Study Discipline, AY 1982-83

| Highest-Ranked Discipline for Graduate Study | Number of Institutions | Percentage of Institutions in Column A That Required Courses In | | | | |
|---|---|---|---|---|---|---|
| | | Biochemistry | Genetics | Plant Structure | Ecology/ Evolution | Plant Physiology |
| | A | B | C | D | E | F |
| Ecology | 40 | 49% | 80% | 61% | 95%[a] | 73% |
| Plant physiology | 17 | 100 | 88 | 59 | 53 | 82[a] |
| Systematics | 15 | 53 | 80 | 87 | 80 | 60 |
| Agronomy/soil science | 14 | 93 | 93 | 64 | 14 | 100 |
| Developmental biology | 10 | 100 | 100 | 80 | 60 | 60 |

[a] The expectation was that all institutions reporting ecology/evolution and plant physiology as the highest-ranked disciplines for graduate student training would require courses in those areas. However, the percentages are less than 100 because several smaller institutions indicated that they had no specific course requirements; study in each field is conducted through advanced seminars or through individually directed work.

Reference: Table 7

## Personnel Supply and Demand

**Shortage Disciplines.** Molecular biology was the discipline most frequently identified by the surveyed institutions as having a shortage of personnel in academia, industry, and government.[5] Biochemistry and genetics were the second most frequently cited shortage areas, depending on the type of employment being considered (see table D).

At land-grant institutions, molecular biology was also the discipline most frequently identified as a shortage area. However, as shown in table D, the second-ranked shortage disciplines at these institutions differed among types of employment.

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[5] Respondents were asked to assess the employment market for plant biologists in 5 categories: (1) postdoctoral training positions, (2) permanent doctoral research associate positions, (3) tenure-track faculty, (4) industrial positions, and (5) federal or state government positions. Respondents identified the disciplines with a shortage and with a surplus of personnel or indicated if there was a supply/demand balance across all fields in a given employment category.

TABLE D--Disciplines Frequently Cited as Having a Shortage of Personnel, by Employment Category, 1982-83

| Employment Category | Type of Institution | Most Frequently Cited | Second Most Frequently Cited |
|---|---|---|---|
| Postdoctoral training positions | All | Molecular biology | Biochemistry |
| | Land-grant | Molecular biology | Biochemistry |
| Permanent doctoral research associate positions | All | Molecular biology | Biochemistry |
| | Land-grant | Molecular biology | Biochemistry; Genetics; Horticulture/crop science |
| Tenure-track faculty positions | All | Molecular biology | Genetics |
| | Land-grant | Molecular biology | Horticulture/crop science |
| Industrial positions | All | Molecular biology | Biochemistry; Genetics |
| | Land-grant | Molecular biology | Genetics; Plant pathology |
| Federal/state government positions | All | Molecular biology | Biochemistry |
| | Land-grant | Molecular biology | Agronomy/soil science |

Reference: Table 9A

TABLE E--Disciplines Frequently Cited as Having a Surplus of Personnel, by Employment Category, 1982-83

| Employment Category | Type of Institution | Most Frequently Cited | Second Most Frequently Cited |
|---|---|---|---|
| Postdoctoral training positions | All | Ecology | Systematics |
| | Land-grant | Ecology | Systematics |
| Permanent doctoral research associate positions | All | Ecology | Anatomy/morphology |
| | Land-grant | Ecology | Plant pathology |
| Tenure-track faculty positions | All | Ecology | Systematics |
| | Land-grant | Ecology | Systematics |
| Industrial positions | All | Ecology | Systematics |
| | Land-grant | Ecology | Systematics; Evolution<br>Anatomy/morphology |
| Federal/state government positions | All | Ecology | Systematics |
| | Land-grant | Ecology | Evolution; Anatomy/morphology |

Reference: Table 9B

**Surplus Disciplines.** Ecology was most frequently cited as the discipline in which there was a surplus of personnel for all employment categories. Systematics was the second most frequently cited surplus discipline in each category except for postdoctorate research positions, where it was replaced by anatomy/morphology.

At land-grant institutions, ecology was most frequently cited as a surplus field regardless of the employment category. The second most frequently cited fields were, variously, systematics, evolution, plant pathology, and anatomy/morphology.

## Organization

More than half (54 percent) of the institutions reported that plant biology graduate work is concentrated in colleges of arts and sciences. Nearly one-third indicated that it was centered in colleges of agriculture, forestry, or natural resources, and one-sixth said it was focused in special colleges, institutes, or divisions such as schools of applied biology, colleges of pure and applied sciences, and divisions of biology and medicine.

However, these figures are misleading in terms of where the bulk of the activity in the field takes place. The institutions with the largest faculties and enrollments are the land-grant institutions. Nearly seven-eighths reported their plant biology efforts concentrated in colleges of agriculture, forestry, or natural resources. The land-grant colleges and universities, though representing less than one-third of the doctoral institutions engaged in graduate work in plant biology, had four-fifths of the faculty and students, awarded four-fifths of the doctorates, and received four-fifths of research support dollars in the field.

## Contrasts between Land-grant and Private Institutions

In the foregoing discussion, few comparisons have been made between land-grant and private institutions because the preponderant share of plant biology activity is centered in the former. As noted above, they accounted for 80 percent of the faculty, doctorates, and graduate students in the field. The public non-land-grant institutions accounted for about 15 percent of the totals in these areas and the private institutions had the remaining 5 percent. Some variations from these patterns appear, however. Private institutions, for example, had 14 percent of all the postdoctoral fellows/associates.

A large part (70 percent) of the research support reported by private institutions came from the federal government. This contrasts with the 44 percent of federal support at land-grant institutions. Private institutions got practically no research funds from the state governments, whereas land-grant institutions received 40 percent of their support from that source. Industry and other sources together provided the private sector with about 30 percent of its research support. This was about double the percentage that those sources furnished the land-grant institutions. Note, however, that in terms of dollars, the funds received by the land-grant institutions far exceeded those received by the private colleges and universities. Land-grant colleges and universities received 8 of every 10 support dollars.

Sources of major support for graduate students also varied between the land-grant and private institutional sectors. More than half of the

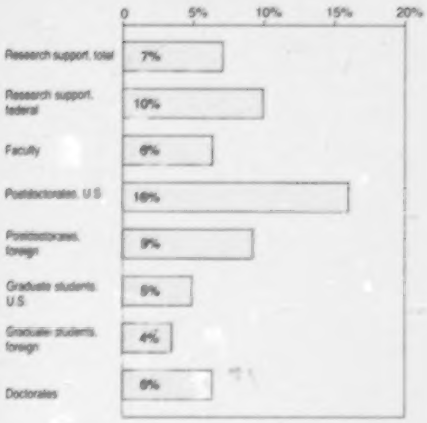

**Figure 9**
Private Institutions' Share
of Plant Biology Support and Personnel

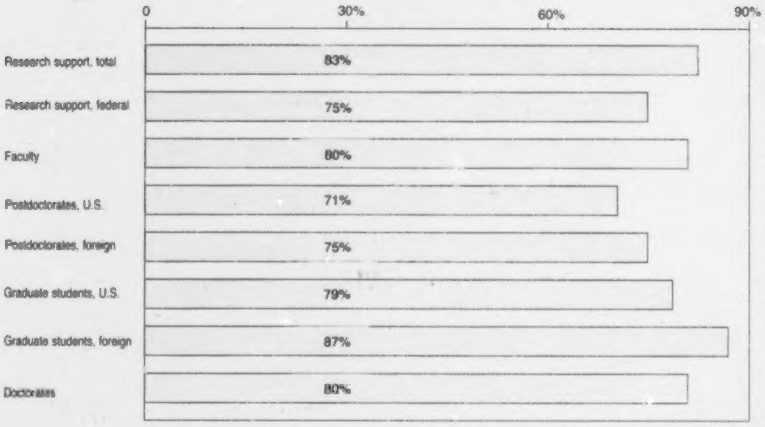

**Figure 10**
Land-grant Institutions' Share
of Plant Biology Support and Personnel

graduate students at private institutions were reported to receive their major support from their college or university and one-third from federal government sources. At land-grant institutions, just over one-quarter received major support from their institutions; just under one-quarter received major support from the federal government.

Private institutions reported a higher proportion of minority group members among U.S. graduate students than did land-grant institutions (16 percent versus 7 percent). They also showed higher proportions of minorities on their faculties (8 percent versus 4 percent). Land-grant institutions, however, counted 42 minorities (6 percent) among their 1982-83 doctoral awards, whereas private institutions reported only one (less than 1 percent). Both types of institution reported about the same proportion (8 percent) of minorities among their U.S. postdoctorates.

The distribution of faculty among departments varied between private and land-grant institutions. At the former, over half (54 percent) of the plant biology faculty were in departments of biology. At land-grant institutions they were found in a wider range of departments, four of which--agriculture and soil science, horticulture, plant pathology, and botany--accounted for over half (56 percent) of the total.

About one-quarter of the private institutions reported faculty vacancies; this contrasts with four-fifths (81 percent) of the land-grant universities. However, because of the difference in total faculty size, the vacancies represented about one-tenth of the plant biology faculty at private institutions, but less than one-twentieth at the land-grant universities.

## 20 Largest Institutions

Separate tallies were made on several questionnaire items for the top 20 responding institutions that received the greatest federal life sciences research and development (R&D) support in 1982.[6] Figure 10 shows several of the survey measures (research support, faculty, postdoctorates, etc.) and the percentages accounted for by these 20 institutions. Whereas these institutions accounted for 20 percent of the federally funded research support in plant biology, they received 33 percent of federally funded R&D in the life sciences in FY 1982.

At the top 20 institutions there were 61 faculty vacancies, which represented nearly 8 percent of the plant biology faculty at these universities. That proportion was about twice the 4 percent figure registered by the remaining 145 institutions.

The principal areas of concentration for postdoctoral research and training at the top 20 institutions varied somewhat from the other colleges and universities. Molecular biology was ranked second at the 20 largest institutions; sixth at the remainder. Systematics was ranked tenth by the 20 large institutions and fifth by the remaining institutions. Table F compares the high-ranking disciplines at the two groups of institutions for each of the three areas of training and research. Detailed table series 6 gives a more complete picture of the rankings.

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[6] These 20 institutions include only 13 of the first 20 on a list prepared by the National Science Foundation (NSF) that rank-ordered institutions by the amount of federal R&D funding in the life sciences for fiscal year 1982. Seven of NSF's first 20 institutions were not included because 2 are medical schools; 2 indicated that they did not have graduate programs in plant biology; 3 did not respond to the questionnaire. To get a total of 20 respondents for this "20 largest" category, it was necessary to go down the NSF ranked list to the 33rd institution.

Shown in Appendix C are the first 50 institutions on the NSF rank-ordered list.

**Figure 11**

20 Largest Institutions' Share of Plant Biology Support and Personnel

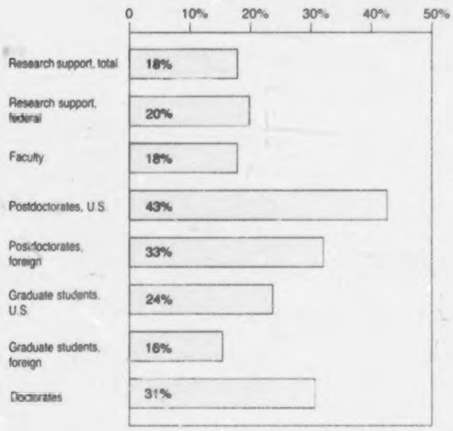

TABLE F--Comparison of Highest Ranking Areas of Concentration at the 20 Largest Institutions with All Other Institutions, AY 1982-83

| 20 Largest Institutions | | All Other Institutions | |
|---|---|---|---|
| Rank | Discipline | Rank | Discipline |
| | Postdoctoral Training and Research | | |
| 1 | Plant physiology | 1 | Plant physiology |
| 2 | Molecular biology | 2 | Biochemistry |
| 3 | Ecology | 3 | Ecology |
| 4 | Biochemistry | 4 | Plant pathology |
| 5 | Plant pathology | 5 | Systematics |
| | Faculty Research | | |
| 1 | Ecology | 1 | Ecology |
| 1 | Plant physiology | 2 | Plant physiology |
| 3 | Molecular biology | 3 | Systematics |
| 4 | Biochemistry | 4 | Biochemistry |
| 4 | Systematics | 5 | Agronomy/soil science |
| | Graduate Student Training | | |
| 1 | Ecology | 1 | Ecology |
| 2 | Plant physiology | 2 | Plant physiology |
| 3 | Molecular biology | 3 | Systematics |
| 3 | Biochemistry | 4 | Agronomy/soil science |
| 5 | Plant pathology | 5 | Biochemistry |
| 5 | Systematics | | |

Reference: Table 6

## Plant Biology's Representation in the Life Sciences

As noted previously, the $98 million of federal funds for research support in plant biology was equal to 4 percent of the total federal research and development (R&D) expenditures in the life sciences for fiscal year 1982. This contrasts with the 12 percent share that plant biology graduate students represented of all graduate students in the life sciences in 1982.[7]

Faculty and postdoctorates in plant biology represented 6 percent of the 101,000 academic scientists in the life sciences at doctorate-granting institutions as reported by the National Science Foundation.[8]

The 1,000 postdoctorates in plant biology reported in this study represented 8 percent of all the postdoctorates in the life sciences at doctorate-granting institutions.[9] It should be noted that postdoctoral training in many of the life sciences, particularly the biomedical disciplines, is now considered a necessary transition between graduate training and a faculty--or faculty equivalent--position. However, that is not true in general for the agricultural sciences.

Women represented 29 percent of all the postdoctorates in plant biology; foreign citizens accounted for 33 percent. Comparable figures for all of the life sciences in 1982 were 26 percent and 30 percent, respectively.[10]

The 925 plant biology doctorates identified by this survey represented 17 percent of the life sciences doctorates reported by the National Research Council (NRC) in its annual doctorate survey.[11] Women were awarded 21 percent of the doctorates in plant biology; this compares with their 31 percent share of all doctorates in the biological sciences.

U.S. citizens who were members of racial/ethnic minorities earned 5 percent of the plant biology Ph.D.'s awarded in 1982-83. In contrast, minorities were awarded 9 percent of all the doctorates in the biological sciences and 8 percent in the agricultural sciences.

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[7] National Science Foundation (NSF), Academic Science/Engineering: Graduate Enrollment and Support, Fall 1982, (Washington, NSF, 1984).

[8] National Science Foundation (NSF), Academic Science and Engineering: Scientists and Engineers, January 1983 (Washington: NSF, 1984).

[9] NSF, Academic Science/Engineering, 1982.

[10] NSF, Academic Science/Engineering, 1982.

[11] NRC, Summary Report 1983, Doctorate Recipients from United States Universities, (Washington: National Academy Press, 1983).

Foreign students represented 20 percent of all the plant biology graduate students in doctorate-granting institutions. The 840 students who received their major support from foreign governments is equal to 52 percent of this enrollment from abroad. These figures--especially the latter--contrast with the 1982 data for all of the life sciences. Foreign students represented only 14 percent of that total, and foreign support in 1982-83 aided only 29 percent of the foreign full-time graduate students.[12]

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[12] NSF, Academic Science/Engineering, 1982.

# METHODS SUMMARY

The foregoing findings are based on data obtained by the Higher Education Panel which forms the basis of a continuing survey research program created in 1971 by the American Council on Education. The Panel's purpose is to conduct surveys on topics of current policy interest to the higher education community and to government agencies.

The Panel is a disproportionate stratified sample of 760 colleges and universities drawn from the population of more than 3,000 institutions listed in the National Center for Education Statistics' Education Directory, Colleges and Universities. All institutions in the population are grouped according to the Panel's stratification design, which is based upon institution type (university, four-year college), control (public, private), and size (full-time-equivalent enrollment). For any given survey, either the entire Panel or an appropriate subgroup is used.

The survey is dependent upon a network of campus representatives at the Panel institutions whose presidents have agreed to participate. The representatives receive the Panel questionnaires and direct them to the most appropriate campus officials for response.

This survey involved a limited number of institutions, those that granted at least five doctorates in the the arts and sciences and engineering combined in 1980--an estimated 209 institutions. Excluded were doctorate-granting institutions that were primarily professional schools of medicine, theology, education, law, and the fine arts.

Questionnaires were sent to the selected institutions in October 1983. The survey was complicated, requiring coordination among numerous departments and, at many universities, between schools of agriculture and colleges of arts and sciences. Thus, "plant biology coordinators," who in most cases were plant biologists, were designated at many of the larger institutions to take the lead in identifying the relevant departments and data sources and in overseeing the completion of the questionnaire. Their assistance was invaluable.

A follow-up mailing was sent to nonrespondents in late November, and follow-up telephone calls were made during December 1983 and January 1984. Data gathering was cut off on January 31, 1984.

Data obtained from the questionnaires, telephone calls, and in some cases, institutions' catalogues, indicated that graduate programs in plant biology were conducted at 165 of the doctorate-granting institutions. Nearly seven-eighths of these institutions provided substantive data which were statistically adjusted by computing institutional weights based upon the ratio of respondents to the number of institutions in the population, separately for each institutional stratum.

Appendix B presents the stratification design used to produce the national estimates and a comparision of respondents and nonrespondents, according to various institutional characteristics.

# DETAILED STATISTICAL TABLES

## TABLE 1

Number of Institutions with Graduate Training Programs in Plant Biology, by School/Division with Primary Responsibility for Training, AY 1982-83

| Administrative Unit in Which Training Is Primarily Focused | All Institutions | Public |  | Private |
|---|---|---|---|---|
|  |  | All | Land-grant |  |
| **All Institutions** |  |  |  |  |
| All administrative units | 165 | 118 | 48 | 47 |
| College/division of arts and sciences | 89 | 56 | 5 | 33 |
| College/school/division of agricultural/forestry/natural resources | 49 | 43 | 41 | 5 |
| Other administrative unit | 27 | 19 | 2 | 9 |
| **20 Largest Institutions[a]** |  |  |  |  |
| All administrative units | 20 | 11 | 7 | 9 |
| College/division of arts and sciences | 13 | 6 | 2 | 7 |
| College/school/division of agricultural/forestry/natural resources | 5 | 4 | 4 | 1 |
| Other administrative unit | 2 | 1 | 1 | 1 |
| **Institutions Other Than the 20 Largest** |  |  |  |  |
| All administrative units | 145 | 107 | 41 | 38 |
| College/division of arts and sciences | 76 | 50 | 3 | 26 |
| College/school/division of agricultural/forestry/natural resources | 44 | 39 | 37 | 4 |
| Other administrative unit | 25 | 18 | 1 | 8 |

[a] The 20 responding institutions with the largest federally financed R&D expenditures in the life sciences in FY 1982.

TABLE 2A

Number of Plant Biologists and the Percentage Training Graduate Students, by Department and by Control of Institution, AY 1982-83

All Institutions

| | All Institutions | | All Public Institutions | | Land-grant Institutions[b] | | Private Institutions | |
|---|---|---|---|---|---|---|---|---|
| Department[a] | Total | Faculty Training Graduate Students as a Percentage of Total | Total | Faculty Training Graduate Students as a Percentage of Total | Total | Faculty Training Graduate Students as a Percentage of Total | Total | Faculty Training Graduate Students as a Percentage of Total |
| All departments | 4,759 | 81% | 4,491 | 81% | 3,802 | 79% | 268 | 81% |
| Botany/plant science | 913 | 83 | 874 | 83 | 717 | 81 | 39 | 87 |
| (Botany) | (600) | (90) | (561) | (90) | (404) | (88) | (39) | (87) |
| (Plant science) | (313) | (72) | (313) | (72) | (313) | (72) | (-) | (nap) |
| Agronomy and soil science | 806 | 73 | 806 | 73 | 795 | 74 | - | nap |
| Biology/biological sciences | 633 | 83 | 466 | 85 | 128 | 81 | 167 | 80 |
| (Biology) | (428) | (82) | (284) | (84) | (74) | (80) | (144) | (76) |
| (Biological sciences) | (205) | (87) | (182) | (86) | (54) | (83) | (23) | (100) |
| Horticulture | 506 | 73 | 506 | 73 | 506 | 73 | - | nap |
| Plant pathology | 434 | 82 | 434 | 82 | 434 | 82 | - | nap |
| Forestry | 246 | 79 | 230 | 77 | 206 | 79 | 16 | 100 |
| Plant and soil science | 195 | 71 | 195 | 71 | 181 | 69 | - | nap |
| Biochemistry | 109 | 93 | 106 | 94 | 100 | 94 | 3 | 33 |
| Genetics | 56 | 89 | 55 | 91 | 55 | 91 | 1 | 0 |
| Chemistry | 18 | 100 | 17 | 100 | 2 | 100 | 1 | 100 |
| Marine sciences/oceanography | 13 | 100 | 13 | 100 | 1 | 100 | - | nap |
| All others | 830 | 87 | 789 | 87 | 677 | 87 | 41 | 78 |

[a] Department names cited by 5 or more institutions.

[b] Land-grant institutions are a subset of "all public" institutions.

- Represents zero

nap Not applicable

Note: Total faculty counts shown in this table differ by 3 percent from those in the series 3 tables. This table shows counts of plant biology faculty in departments that were involved in training plant biology graduate students. The series 3 tables show counts of faculty in plant biology programs. See appendix A for a facsimile of the survey questionnaire.

## TABLE 2B

### Number of Plant Biologists and the Percentage Training Graduate Students, by Department and by Control of Institution, AY 1982-83

### 20 Largest Institutions[a]

| Department[b] | All Institutions | | All Public Institutions | | Land-grant Institutions[b] | | Private Institutions | |
|---|---|---|---|---|---|---|---|---|
| | Total | Faculty Training Graduate Students as a Percentage of Total | Total | Faculty Training Graduate Students as a Percentage of Total | Total | Faculty Training Graduate Students as a Percentage of Total | Total | Faculty Training Graduate Students as a Percentage of Total |
| All departments | 863 | 85% | 762 | 85% | 676 | 83% | 101 | 87% |
| Botany/plant science | 118 | 98 | 101 | 98 | 72 | 97 | 17 | 100 |
| (Botany) | (96) | (100) | (79) | (100) | (50) | (100) | (17) | (100) |
| (Plant science) | (22) | (91) | (22) | (91) | (22) | (91) | (-) | (nap) |
| Agronomy and soil science | 52 | 77 | 52 | 77 | 52 | 77 | - | nap |
| Biology/biological sciences | 87 | 90 | 40 | 93 | 26 | 92 | 47 | 87 |
| (Biology) | (64) | (86) | (30) | (90) | (16) | (88) | (34) | (82) |
| (Biological sciences) | (23) | (100) | (10) | (100) | (10) | (100) | (13) | (100) |
| Horticulture | 99 | 76 | 99 | 76 | 99 | 76 | - | nap |
| Plant pathology | 80 | 93 | 80 | 93 | 80 | 93 | - | nap |
| Forestry | 80 | 79 | 66 | 74 | 66 | 74 | 14 | 100 |
| Plant and soil science | 42 | 45 | 42 | 45 | 42 | 45 | - | nap |
| Biochemistry | 33 | 100 | 32 | 100 | 28 | 100 | 1 | 100 |
| Genetics | 25 | 96 | 25 | 96 | 25 | 96 | - | nap |
| Chemistry | 6 | 100 | 6 | 100 | 1 | 100 | - | nap |
| Marine sciences/oceanography | 3 | 100 | 3 | 100 | - | nap | - | nap |
| All others | 238 | 85 | 216 | 87 | 185 | 85 | 22 | 68 |

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[a] The 20 responding institutions with the largest federally finance R&D expenditures oin the life sciences in 1982.

[b] Department names cited by 5 or more institutions.

[c] Land-grant institutions are a subset of "all public" institutions.

- Represents zero

nap Not applicable

Note: The total faculty count shown in this table differs by 10 percent from that shown in the series 3 tables. This table shows counts of plant biology faculty in departments that were involved in training plant biology graduate students. The series 3 tables show counts of faculty in plant biology programs. See appendix A for a facsimile of the survey questionnaire.

## TABLE 2C

### Number of Plant Biologists and the Percentage Training Graduate Students, by Department and by Control of Institution, AY 1982-83

Institutions Other than the 20 Largest

| Department[a] | All Institutions | | All Public Institutions | | Land-grant Institutions[b] | | Private Institutions | |
|---|---|---|---|---|---|---|---|---|
| | Total | Faculty Training Graduate Students as a Percentage of Total | Total | Faculty Training Graduate Students as a Percentage of Total | Total | Faculty Training Graduate Students as a Percentage of Total | Total | Faculty Training Graduate Students as a Percentage of Total |
| All departments | 3,896 | 80% | 3,729 | 80% | 3,126 | 79% | 167 | 77% |
| Botany/plant science | 795 | 81 | 773 | 81 | 645 | 79 | 22 | 77 |
| (Botany) | (504) | (88) | (482) | (88) | (354) | (86) | (22) | (77) |
| (Plant science) | (291) | (70) | (291) | (70) | (291) | (70) | (-) | (nap) |
| Agronomy and soil science | 754 | 73 | 754 | 73 | 743 | 73 | - | nap |
| Biology/biological sciences | 546 | 82 | 426 | 84 | 102 | 78 | 120 | 77 |
| (Biology) | (364) | (81) | (254) | (84) | (58) | (78) | (110) | (75) |
| (Biological sciences) | (182) | (86) | (172) | (85) | (44) | (80) | (10) | (100) |
| Horticulture | 407 | 72 | 407 | 72 | 407 | 72 | - | nap |
| Plant pathology | 354 | 80 | 354 | 80 | 354 | 80 | - | nap |
| Forestry | 166 | 79 | 164 | 79 | 140 | 81 | 2 | 100 |
| Plant and soil science | 153 | 78 | 153 | 78 | 139 | 76 | - | nap |
| Biochemistry | 76 | 89 | 74 | 92 | 72 | 92 | 2 | 0 |
| Genetics | 31 | 84 | 30 | 87 | 30 | 87 | 1 | 0 |
| Chemistry | 12 | 100 | 11 | 100 | 1 | 100 | 1 | 100 |
| Marine sciences/oceanography | 10 | 100 | 10 | 100 | 1 | 100 | - | nap |
| All others | 592 | 87 | 573 | 87 | 492 | 87 | 19 | 89 |

[a] Department names cited by 5 or more institutions.

[b] Land-grant institutions are a subset of "all public" institutions.

- Represents zero

nap Not applicable

Note: The total faculty counts shown in this table differs by 2 percent from that shown in the series 3 tables. This table shows counts of plant biology faculty in departments that were involved in training plant biology graduate students. The series 3 tables show counts of faculty in plant biology programs. See appendix A for a facsimile of the survey questionnaire.

## TABLE 3

### Students and Faculty in Graduate Plant Biology Programs, by Type of Institution and by Sex, AY 1982-83, with Total Estimates for AY 1983-84

| Type of Student/Faculty | 1982-83 Men | 1982-83 Women | 1982-83 Total | 1983-84 Estimated Total |
|---|---|---|---|---|
| **All Institutions** | | | | |
| Full-time graduate students | 5,539 | 2,484 | 8,023 | 8,040 |
| Ph.D. recipients | 730 | 195 | 925 | 1,050 |
| Postdoctoral fellows/associates | 715 | 294 | 1,009 | 1,020 |
| Full-time faculty | 4,288 | 319 | 4,607 | 4,660 |
| **Public Institutions** | | | | |
| Full-time graduate students | 5,287 | 2,361 | 7,648 | 7,670 |
| Ph.D. recipients | 691 | 177 | 868 | 970 |
| Postdoctoral fellows/associates | 630 | 241 | 871 | 860 |
| Full-time faculty | 4,067 | 277 | 4,344 | 4,400 |
| **Land-grant Institutions** | | | | |
| Full-time graduate students | 4,568 | 1,874 | 6,442 | 6,500 |
| Ph.D. recipients | 600 | 140 | 740 | 810 |
| Postdoctoral fellows/associates | 523 | 208 | 731 | 730 |
| Full-time faculty | 3,467 | 207 | 3,674 | 3,720 |
| **Private Institutions** | | | | |
| Full-time graduate students | 252 | 123 | 375 | 370 |
| Ph.D. recipients | 39 | 18 | 57 | 80 |
| Postdoctoral fellows/associates | 85 | 53 | 138 | 160 |
| Full-time faculty | 221 | 42 | 263 | 260 |
| **20 Largest Institutions[a]** | | | | |
| Full-time graduate students | 1,206 | 562 | 1,768 | 1,750 |
| Ph.D. recipients | 226 | 65 | 291 | 290 |
| Postdoctoral fellows/associates | 281 | 117 | 398 | 400 |
| Full-time faculty | 730 | 54 | 784 | 800 |
| **Institutions Other Than the 20 Largest** | | | | |
| Full-time graduate students | 4,333 | 1,922 | 6,255 | 6,290 |
| Ph.D. recipients | 504 | 130 | 634 | 760 |
| Postdoctoral fellows/associates | 434 | 177 | 611 | 620 |
| Full-time faculty | 3,558 | 265 | 3,823 | 3,860 |

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[a] The 20 responding institutions with the largest federally financed R&D expenditures in the life sciences in FY 1982.

## TABLE 4

### Number of Racial/Ethnic Minority[a] Students and Faculty in Graduate Plant Biology Programs, by Type of Institution, AY 1982-83

| Type of Student/Faculty | All Institutions | Public |  | Private |
|---|---|---|---|---|
|  |  | All | Land-grant |  |
| All Institutions |  |  |  |  |
| Full-time students | 459 | 411 | 359 | 48 |
| 1982-93 Ph.D. recipients | 46 | 45 | 42 | 1 |
| Postdoctoral fellows/ associates | 72 | 63 | 41 | 9 |
| Full-time faculty | 207 | 185 | 150 | 22 |
| 20 Largest Institutions[b] |  |  |  |  |
| Full-time students | 74 | 65 | 62 | 9 |
| 1982-93 Ph.D. recipients | 9 | 9 | 9 | 0 |
| Postdoctoral fellows/ associates | 17 | 11 | 10 | 6 |
| Full-time faculty | 18 | 17 | 15 | 1 |
| Institutions Other Than the 20 Largest |  |  |  |  |
| Full-time students | 385 | 346 | 297 | 39 |
| 1982-93 Ph.D. recipients | 37 | 36 | 33 | 1 |
| Postdoctoral fellows/ associates | 55 | 52 | 31 | 3 |
| Full-time faculty | 189 | 168 | 135 | 21 |

[a] Racial/ethnic groups included were: American Indian/Alaskan Native; Black, non-Hispanic; Asian or Pacific Islander; Hispanic. Racial/ethnic group data pertain to U.S. citizens and non-U.S. citizens with permanent visas only.

[b] The 20 responding institutions with the largest federally financed R&D expenditures in the life sciences in FY 1982.

## TABLE 5

### Number of Graduate Students and Postdoctorates in Plant Biology Programs, by Sex and Citizenship Status, AY 1982-83

| Type of Individual | Total | Men | Women | From Developing Countries |
|---|---|---|---|---|
| **All Institutions** | | | | |
| Total | | | | |
| Full-time graduate students | 8,023 | 5,539 | 2,484 | na |
| Postdoctoral fellows/associates | 1,009 | 715 | 294 | na |
| Foreign citizens[a] | | | | |
| Full-time graduate students | 1,612 | 1,284 | 328 | 1,248 |
| Postdoctoral fellows/associates | 331 | 266 | 65 | 130 |
| U.S. citizens[b] | | | | |
| Full-time graduate students | 6,411 | 4,255 | 2,156 | na |
| Postdoctoral fellows/associates | 678 | 449 | 229 | na |
| **Public Institutions** | | | | |
| Total | | | | |
| Full-time graduate students | 7,648 | 5,287 | 2,361 | na |
| Postdoctoral fellows/associates | 871 | 630 | 241 | na |
| Foreign citizens[a] | | | | |
| Full-time graduate students | 1,543 | 1,235 | 308 | 1,200 |
| Postdoctoral fellows/associates | 301 | 242 | 59 | 119 |
| U.S. citizens[b] | | | | |
| Full-time graduate students | 6,105 | 4,052 | 2,053 | na |
| Postdoctoral fellows/associates | 570 | 388 | 182 | na |
| **Land-grant Institutions** | | | | |
| Total | | | | |
| Full-time graduate students | 6,442 | 4,568 | 1,874 | na |
| Postdoctoral fellows/associates | 731 | 523 | 208 | na |
| Foreign citizens[a] | | | | |
| Full-time graduate students | 1,405 | 1,149 | 256 | 1,098 |
| Postdoctoral fellows/associates | 247 | 197 | 50 | 85 |
| U.S. citizens[b] | | | | |
| Full-time graduate students | 5,037 | 3,419 | 1,618 | na |
| Postdoctoral fellows/associates | 484 | 326 | 158 | na |

## TABLE 5--Continued

Number of Graduate Students and Postdoctorates in Plant Biology Programs, by Sex and Citizenship Status, AY 1982-83

| Type of Individual | Total | Men | Women | From Developing Countries |
|---|---|---|---|---|
| **Private Institutions** | | | | |
| Total | | | | |
| Full-time graduate students | 375 | 252 | 123 | na |
| Postdoctoral fellows/associates | 138 | 85 | 53 | na |
| Foreign citizens[a] | | | | |
| Full-time graduate students | 69 | 49 | 20 | 48 |
| Postdoctoral fellows/associates | 30 | 24 | 6 | 11 |
| U.S. citizens[b] | | | | |
| Full-time graduate students | 306 | 203 | 103 | na |
| Postdoctoral fellows/associates | 108 | 61 | 47 | na |
| **20 Largest Institutions[c]** | | | | |
| Total | | | | |
| Full-time graduate students | 1,768 | 1,206 | 562 | na |
| Postdoctoral fellows/associates | 398 | 281 | 117 | na |
| Foreign citizens[a] | | | | |
| Full-time graduate students | 250 | 197 | 53 | 140 |
| Postdoctoral fellows/associates | 108 | 89 | 19 | 33 |
| U.S. citizens[b] | | | | |
| Full-time graduate students | 1,518 | 1,009 | 509 | na |
| Postdoctoral fellows/associates | 290 | 192 | 98 | na |
| **Institutions Other than the 20 Largest** | | | | |
| Total | | | | |
| Full-time graduate students | 6,255 | 4,333 | 1,922 | na |
| Postdoctoral fellows/associates | 611 | 434 | 177 | na |
| Foreign citizens[a] | | | | |
| Full-time graduate students | 1,362 | 1,087 | 275 | 1,108 |
| Postdoctoral fellows/associates | 223 | 177 | 46 | 97 |
| U.S. citizens[b] | | | | |
| Full-time graduate students | 4,893 | 3,246 | 1,647 | na |
| Postdoctoral fellows/associates | 388 | 257 | 131 | na |

[a] Individuals who are non-U.S. citizens on temporary visas.

[b] Includes non-U.S. citizens who have permanent visas.

[c] The 20 responding institutions with the largest federally financed R&D expenditures in the life sciences in FY 1982.

na Not available. Developing countries data were requested for foreign (temporary visa) individuals only.

## TABLE 6

### Principal Areas of Concentration in Training and Research in Plant Biology, by Discipline, AY 1982-83

| Discipline | Graduate Student Training | Postdoctoral Research & Training | Faculty Research |
|---|---|---|---|
| **All Institutions (N = 165)** | | | |
| Total | 100.0% | 100.0% | 100.0% |
| Agronomy/soil science | 7.6 | 3.8 | 5.7 |
| Anatomy/morphology | 2.1 | 3.6 | 3.6 |
| Biochemistry | 7.1 | 14.1 | 7.2 |
| Cell biology | 4.1 | 5.0 | 5.2 |
| Developmental biology | 5.6 | 5.0 | 5.6 |
| Ecology | 19.5 | 10.9 | 18.5 |
| Evolution | 2.5 | 1.6 | 3.0 |
| Forestry/natural resources | 3.5 | 2.6 | 3.1 |
| Genetics | 5.1 | 3.2 | 3.7 |
| Horticulture crop science | 3.0 | 2.4 | 3.7 |
| Molecular biology | 4.2 | 7.2 | 4.2 |
| Plant pathology | 4.8 | 7.9 | 5.0 |
| Plant physiology | 15.6 | 21.0 | 17.9 |
| Systematics | 10.5 | 5.7 | 10.0 |
| Weed science | 0.4 | 1.7 | 0.5 |
| Other | 4.4 | 4.3 | 3.1 |
| **20 Largest Institutions[a] (N=20)** | | | |
| Total | 100.0% | 100.0% | 100.0% |
| Agronomy/soil science | 1.7 | 2.5 | 0 |
| Anatomy/morphology | 0 | 0.8 | 2.5 |
| Biochemistry | 11.7 | 10.0 | 9.2 |
| Cell biology | 2.5 | 8.3 | 2.5 |
| Developmental biology | 5.8 | 5.0 | 5.0 |
| Ecology | 20.7 | 11.7 | 16.6 |
| Evolution | 5.0 | 0.8 | 6.7 |
| Forestry/natural resources | 2.5 | 5.8 | 2.5 |
| Genetics | 2.5 | 7.5 | 4.2 |
| Horticulture crop science | 5.0 | 0.8 | 7.5 |
| Molecular biology | 11.7 | 16.7 | 13.3 |
| Plant pathology | 6.7 | 9.2 | 4.2 |
| Plant physiology | 15.0 | 17.6 | 16.6 |
| Systematics | 6.7 | 3.3 | 9.2 |
| Weed science | 0 | 0 | 0 |
| Other | 2.5 | 0 | 0 |

## TABLE 6--Continued

### Principal Areas of Concentration in Training and Research in Plant Biology, by Discipline, AY 1982-83

| Discipline | Graduate Student Training | Postdoctoral Research & Training | Faculty Research |
|---|---|---|---|
| Institutions Other than 20 Largest (N=145) | | | |
| Total | 100.0% | 100.0% | 100.0% |
| Agronomy/soil science | 8.4 | 4.0 | 6.5 |
| Anatomy/morphology | 2.4 | 4.0 | 3.7 |
| Biochemistry | 6.5 | 14.6 | 7.0 |
| Cell biology | 4.3 | 4.5 | 5.6 |
| Developmental biology | 5.6 | 5.0 | 5.7 |
| Ecology | 19.4 | 10.8 | 18.6 |
| Evolution | 2.1 | 1.8 | 2.4 |
| Forestry/natural resources | 3.6 | 2.1 | 3.2 |
| Genetics | 5.4 | 2.6 | 3.6 |
| Horticulture crop science | 2.7 | 2.6 | 3.2 |
| Molecular biology | 3.1 | 5.9 | 2.9 |
| Plant pathology | 4.5 | 7.7 | 5.2 |
| Plant physiology | 15.8 | 21.4 | 18.0 |
| Systematics | 11.0 | 6.1 | 10.2 |
| Weed science | 0.5 | 2.0 | 0.6 |
| Other | 4.7 | 4.9 | 3.6 |

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[a] The 20 responding institutions with the largest federally financed R&D expenditures in the life sciences in FY 1982.

Note: Percentage distribution of weighted scores. Respondents indicated the first-, second-, and third-ranking disciplines for each type of training/research. These rankings were converted to scores which in turn were converted to the percentages shown here.

TABLE 7

Required Courses by Highest-Ranked Discipline

| Discipline Ranked Highest for Graduate Training | Number of Institutions That Ranked Discipline Highest | Number of Institutions That Required Courses in: | | | | |
|---|---|---|---|---|---|---|
| | | Biochemistry | Genetics | Plant Structure | Ecology/ Evolution | Plant Physiology |
| | All Institutions (N = 165) | | | | | |
| Total | 165 | 119 | 138 | 95 | 103 | 115 |
| Agronomy/soil science | 14 | 13 | 13 | 9 | 2 | 14 |
| Anatomy/morphology | 2 | 2 | 2 | 1 | 2 | 1 |
| Biochemistry | 8 | 8 | 6 | 2 | 3 | 4 |
| Cell biology | 8 | 8 | 7 | 2 | 3 | 4 |
| Developmental biology | 10 | 10 | 10 | 8 | 6 | 6 |
| Ecology | 41 | 20 | 33 | 25 | 39 | 30 |
| Evolution | 3 | 1 | 3 | 1 | 3 | 1 |
| Forestry/natural resources | 4 | 2 | 1 | 4 | 4 | 4 |
| Genetics | 7 | 3 | 7 | 2 | 3 | 5 |
| Horticulture/crop science | 5 | 5 | 5 | 4 | 1 | 4 |
| Molecular biology | 7 | 7 | 7 | 1 | 3 | 5 |
| Plant pathology | 9 | 7 | 8 | 9 | 6 | 8 |
| Plant physiology | 17 | 17 | 15 | 10 | 9 | 14 |
| Systematics | 15 | 8 | 12 | 13 | 12 | 9 |
| Other | 9 | 8 | 9 | 4 | 7 | 8 |
| No response | 6 | nap | nap | nap | nap | nap |
| | Public Institutions (N=118) | | | | | |
| Total | 118 | 85 | 103 | 74 | 76 | 90 |
| Agronomy/soil science | 14 | 13 | 13 | 9 | 2 | 14 |
| Anatomy/morphology | 2 | 2 | 2 | 1 | 2 | 1 |
| Biochemistry | 4 | 4 | 4 | 1 | 2 | 2 |
| Cell biology | 5 | 5 | 5 | 2 | 2 | 4 |
| Developmental biology | 5 | 5 | 5 | 5 | 5 | 4 |
| Ecology | 28 | 13 | 23 | 17 | 27 | 20 |
| Evolution | 2 | - | 2 | 1 | 2 | 1 |
| Forestry/natural resources | 4 | 2 | 1 | 4 | 4 | 4 |
| Genetics | 5 | 2 | 5 | 1 | 2 | 4 |
| Horticulture/crop science | 5 | 5 | 5 | 4 | 1 | 4 |
| Molecular biology | 2 | 2 | 2 | - | 1 | 2 |
| Plant pathology | 9 | 7 | 8 | 9 | 6 | 8 |
| Plant physiology | 12 | 12 | 11 | 8 | 6 | 10 |
| Systematics | 9 | 6 | 9 | 8 | 8 | 7 |
| Other | 8 | 7 | 8 | 4 | 6 | 7 |
| No response | 4 | nap | nap | nap | nap | nap |
| | Private Institutions (N=47) | | | | | |
| Total | 47 | 34 | 35 | 21 | 27 | 25 |
| Agronomy/soil science | - | - | - | - | - | - |
| Anatomy/morphology | - | - | - | - | - | - |
| Biochemistry | 4 | 4 | 2 | 1 | 1 | 2 |
| Cell biology | 3 | 3 | 2 | - | 1 | - |
| Developmental biology | 5 | 5 | 5 | 3 | 1 | 2 |
| Ecology | 13 | 7 | 10 | 8 | 12 | 10 |
| Evolution | 1 | 1 | 1 | - | 1 | - |
| Forestry/natural resources | - | - | - | - | - | - |
| Genetics | 2 | 1 | 2 | 1 | 1 | 1 |
| Horticulture/crop science | - | - | - | - | - | - |
| Molecular biology | 5 | 5 | 5 | 1 | 2 | 3 |
| Plant pathology | - | - | - | - | - | - |
| Plant physiology | 5 | 5 | 4 | 2 | 3 | 4 |
| Systematics | 6 | 2 | 3 | 5 | 4 | 2 |
| Other | 1 | 1 | 1 | - | 1 | 1 |
| No response | 2 | nap | nap | nap | nap | nap |

- Means zero.

nap: Not applicable

## TABLE 8A

## Number of Institutions with Faculty Vacancies in Plant Biology and Number of Vacancies

| Item | All Institutions | Public | | Private | 20 Largest[a] Institutions | Institutions Other than 20 Largest |
|---|---|---|---|---|---|---|
| | | All | Land-grant | | | |
| Number of institutions with vacancy | 67 | 54 | 39 | 13 | 15 | 52 |
| Number of vacancies | 213 | 190 | 168 | 23 | 61 | 152 |

[a] The 20 responding institutions with the largest federally financed R&D expenditures in the life sciences in FY 1982.

## TABLE 8B

## Number of Institutions with Faculty Vacancies, by Discipline with Greatest Need for Faculty

| Discipline | All Institutions | Public | | Private | 20 Largest Institutions[a] | Institutions Other than 20 Largest |
|---|---|---|---|---|---|---|
| | | All | Land-grant | | | |
| All disciplines | 67 | 54 | 39 | 13 | 15 | 52 |
| Molecular biology | 18 | 12 | 7 | 6 | 4 | 14 |
| Horticulture/crop science | 8 | 8 | 8 | - | - | 7 |
| Agronomy/soil science | 7 | 7 | 6 | - | - | 7 |
| All others | 34 | 27 | 18 | 7 | 10 | 24 |

[a] The 20 responding institutions with the largest federally financed R&D expenditures in the life sciences in FY 1982.

Note: This table shows the estimated number of institutions with one or more faculty vacancies as of fall 1983 in plant biology programs. The three disciplines listed are those most frequently identified as having the greatest need for faculty.

## TABLE 8C

## Most Important Reason for Need to Recruit Plant Biology Faculty, by Discipline: Institutional Counts

| Discipline | All Reasons | Research Opportunities | Faculty Retirements/ Departures | Increased Graduate Enrollments | Other | No Reason Given |
|---|---|---|---|---|---|---|
| Total | 67 | 33 | 24 | 3 | 5 | 2 |
| Agronomy/soil science | 7 | 1 | 6 | - | - | - |
| Anatomy/morphology | 4 | - | 3 | 1 | - | - |
| Biochemistry | 4 | 4 | - | - | - | - |
| Cell biology | 1 | 1 | - | - | - | - |
| Developmental biology | 4 | 2 | - | - | 2 | - |
| Ecology | 2 | - | 1 | - | 1 | - |
| Evolution | - | - | - | - | - | - |
| Forestry/natural resources | 3 | 2 | - | - | 1 | - |
| Genetics | 1 | - | 1 | - | - | - |
| Horticulture/crop science | 8 | 4 | 4 | - | - | - |
| Molecular biology | 18 | 12 | 4 | 1 | 1 | - |
| Plant pathology | 4 | 3 | 1 | - | - | - |
| Plant physiology | 5 | 2 | 3 | - | - | - |
| Systematics | 1 | - | 1 | - | - | - |
| Weed science | - | - | - | - | - | - |
| Other | 3 | 2 | - | 1 | - | - |
| No discipline identified | 2 | - | - | - | - | 2 |

TABLE 9A

Disciplines Most Frequently Cited as Having a Shortage of Personnel, by Employment Category and Type of Institution

| Employment Category | Most Frequently Cited Discipline | Second Most Frequently Cited Discipline |
|---|---|---|
| All Institutions | | |
| Postdoctoral training positions | Molecular biology | Biochemistry |
| Permanent doctoral research associate positions | Molecular biology | Biochemistry |
| Tenure-track faculty positions | Molecular biology | Genetics |
| Industrial positions | Molecular biology | Biochemistry<br>Genetics |
| Federal/state government positions | Molecular biology | Biochemistry |
| Public Institutions | | |
| Postdoctoral training positions | Molecular biology | Biochemistry<br>Plant physiology |
| Permanent doctoral research associate positions | Molecular biology | Biochemistry<br>Plant physiology |
| Tenure-track faculty positions | Molecular biology | Genetics |
| Industrial positions | Molecular biology | Genetics |
| Federal/state government positions | Molecular biology | Agronomy/soil science |
| Private Institutions | | |
| Postdoctoral training positions | Molecular biology | Biochemistry |
| Permanent doctoral research associate postitions | Molecular biology | Biochemistry |
| Tenure-track faculty positions | Molecular biology | Biochemistry |
| Industrial positions | Molecular biology | Biochemistry |
| Federal/state government positions | Molecular biology | Biochemistry |
| Land-grant Institutions | | |
| Postdoctoral training positions | Molecular biology | Biochemistry |
| Permanent doctoral research associate postitions | Molecular biology | Biochemistry<br>Horticulture/crop science |
| Tenure-track faculty positions | Molecular biology | Horticulture/crop science |
| Industrial positions | Molecular biology | Genetics<br>Plant pathology |
| Federal/state government positions | Molecular biology | Agronomy/soil science |

## TABLE 9B

### Disciplines Most Frequently Cited as Having a Surplus of Personnel, by Employment Category and Type of Institution

| Employment Category | Most Frequently Cited Discipline | Second Most Frequently Cited Discipline |
|---|---|---|
| **All Institutions** | | |
| Postdoctoral training positions | Ecology | Sytematics |
| Permanent doctoral research associate positions | Ecology | Anatomy/morphology |
| Tenure-track faculty positions | Ecology | Sytematics |
| Industrial positions | Ecology | Systematics |
| Federal/state government positions | Ecology | Systematics |
| **Public Institutions** | | |
| Postdoctoral training positions | Ecology | Systematics |
| Permanent doctoral research associate postitions | Ecology | Anatomy/morphology |
| Tenure-track faculty positions | Ecology | Systematics |
| Industrial positions | Ecology | Systematics |
| Federal/state government positions | Ecology | Anatomy/morphology |
| **Private Institutions** | | |
| Postdoctoral training positions | Ecology | Systematics |
| Permanent doctoral research associate postitions | Systematics | Ecology |
| Tenure-track faculty positions | Ecology | Systematics |
| Industrial positions | Ecology | Systematics |
| Federal/state government positions | Ecology | Systematics |
| **Land-grant Institutions** | | |
| Postdoctoral training positions | Ecology | Systematics |
| Permanent doctoral research associate postitions | Ecology | Plant pathology |
| Tenure-track faculty positions | Ecology | Systematics |
| Industrial positions | Ecology | Anatomy/morphology<br>Evolution<br>Systematics |
| Federal/state government positions | Ecology | Anatomy/morphology<br>Evolution |

## TABLE 10

## Full-time Graduate Students and Postdoctoral Fellows in Plant Biology, by Major Source of Support, AY 1982-83

| Source of Support | Full-time Graduate Students Number | Full-time Graduate Students Percent | Postdoctoral Fellows/associates Number | Postdoctoral Fellows/associates Percent |
|---|---|---|---|---|
| **All Institutions (N = 165)** | | | | |
| Total | 8,023 | 100.0 | 1,009 | 100.0 |
| Federal fellowship | 270 | 3.4 | 63 | 6.2 |
| Federal research grant | 1,586 | 19.8 | 545 | 54.0 |
| State government | 950 | 11.8 | 69 | 6.9 |
| Foreign government[a] | 840 | 10.5 | 107 | 10.6 |
| Institutional support | 2,400 | 29.9 | 75 | 7.5 |
| Industry | 520 | 6.5 | 84 | 8.3 |
| Other non-industry non-personal support | 293 | 3.6 | 58 | 5.7 |
| Personal funds | 1,164 | 14.5 | 8 | 0.8 |
| **Public Institutions (N = 118)** | | | | |
| Total | 7,648 | 100.0 | 871 | 100.0 |
| Federal fellowship | 222 | 2.9 | 32 | 3.7 |
| Federal research grant | 1,513 | 19.8 | 492 | 56.4 |
| State government | 948 | 12.4 | 68 | 7.8 |
| Foreign government[b] | 827 | 10.8 | 93 | 10.7 |
| Institutional support | 2,204 | 28.9 | 61 | 7.0 |
| Industry | 514 | 6.7 | 74 | 8.5 |
| Other non-industry non-personal support | 285 | 3.7 | 45 | 5.2 |
| Personal funds | 1,135 | 14.8 | 6 | 0.7 |
| **Land-grant Institutions (N = 48)** | | | | |
| Total | 6,442 | 100.0 | 731 | 100.0 |
| Federal fellowship | 187 | 2.9 | 25 | 3.4 |
| Federal research grant | 1,268 | 19.7 | 398 | 54.3 |
| State government | 807 | 12.5 | 63 | 8.7 |
| Foreign government[c] | 800 | 12.4 | 79 | 10.8 |
| Institutional support | 1,664 | 25.8 | 52 | 7.2 |
| Industry | 493 | 7.7 | 67 | 9.2 |
| Other non-industry non-personal support | 246 | 3.8 | 41 | 5.6 |
| Personal funds | 977 | 15.2 | 6 | 0.8 |

---

[a] The counts on this line represent 52 and 32 percent, respectively, of all foreign graduate students and postdoctorates in plant biology.

[b] The counts on this line represent 54 and 31 percent, respectively, of the foreign graduate students and postdoctorates in plant biology at public institutions.

[c] The counts on this line represent 57 and 32 percent, respectively, of the foreign graduate students and postdoctorates in plant biology at land-grant institutions.

## TABLE 10--Continued

### Full-time Graduate Students and Postdoctoral Fellows in Plant Biology, by Major Source of Support, AY 1982-83

| Source of Support | Full-time Graduate Students Number | Full-time Graduate Students Percent | Postdoctoral Fellows/associates Number | Postdoctoral Fellows/associates Percent |
|---|---|---|---|---|
| **Private Institutions (N = 47)** | | | | |
| Total | 375 | 100.0 | 138 | 100.0 |
| Federal fellowship | 48 | 12.9 | 30 | 22.1 |
| Federal research grant | 74 | 19.7 | 54 | 38.8 |
| State government | 2 | 0.6 | 1 | 0.8 |
| Foreign government[d] | 12 | 3.3 | 14 | 9.8 |
| Institutional support | 195 | 51.9 | 15 | 10.6 |
| Industry | 7 | 1.7 | 10 | 7.4 |
| Other non-industry non-personal support | 8 | 2.1 | 12 | 8.9 |
| Personal funds | 29 | 7.8 | 2 | 1.6 |
| **20 Largest Institutions[e] (N = 20)** | | | | |
| Total | 1,768 | 100.0 | 398 | 100.0 |
| Federal fellowship | 105 | 5.9 | 42 | 10.6 |
| Federal research grant | 482 | 27.3 | 201 | 50.5 |
| State government | 120 | 6.8 | 21 | 5.3 |
| Foreign government[f] | 117 | 6.6 | 34 | 8.5 |
| Institutional support | 515 | 29.1 | 24 | 6.0 |
| Industry | 156 | 8.8 | 37 | 9.3 |
| Other non-industry non-personal support | 81 | 4.6 | 35 | 8.8 |
| Personal funds | 192 | 10.9 | 4 | 1.0 |
| **Institutions Other Than the 20 Largest (N =145)** | | | | |
| Total | 6,255 | 100.0 | 611 | 100.0 |
| Federal fellowship | 165 | 2.6 | 21 | 3.4 |
| Federal research grant | 1,104 | 17.6 | 344 | 56.3 |
| State government | 830 | 13.3 | 48 | 7.9 |
| Foreign government[g] | 723 | 11.6 | 73 | 11.9 |
| Institutional support | 1,885 | 30.2 | 51 | 8.3 |
| Industry | 364 | 5.8 | 47 | 7.7 |
| Other non-industry non-personal support | 212 | 3.4 | 23 | 3.8 |
| Personal funds | 972 | 15.5 | 4 | 0.7 |

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[d] The counts on this line represent 17 and 47 percent, respectively, of the foreign graduate students and postdoctorates in plant biology at private institutions.

[e] The 20 responding institutions with the largest federally financed R&D expenditures in the life sciences in FY 1982.

[f] The counts on this line represent 47 and 32 percent, respectively, of the foreign graduate students and postdoctorates in plant biology at the 20 largest responding institutions.

[g] The counts on this line represent 53 and 33 percent, respectively, of the foreign graduate students and postdoctorates in plant biology at institutions other than the 20 largest responding institutions.

## TABLE 11A

### Amount of Research Support for Plant Biology, by Type of Institution and Source, FY 1983

(Dollars in thousands)

| Type of Institution | Total | | Source of Support | | | |
|---|---|---|---|---|---|---|
| | Dollars | Percent | Federal Government | State Government | Industry | Other |
| (Number of Institutions) | (147) | (na) | (128) | (89) | (79) | (91) |
| All institutions | $201,569.6 | 100.0 | $97,988.3 | $69,023.7 | $19,486.4 | $15,071.2 |
| Public institutions | 186,959.5 | 92.8 | 87,774.7 | 69,000.1 | 17,243.7 | 12,941.0 |
| Land-grant institutions | 166,993.9 | 82.8 | 73,339.8 | 66,938.8 | 14,842.2 | 11,873.1 |
| Private institutions | 14,610.1 | 7.2 | 10,213.6 | 23.6 | 2,242.7 | 2,130.2 |
| 20 largest institutions[a] | 36,923.8 | 18.3 | 19,959.9 | 9,506.3 | 4,253.4 | 3,204.2 |
| Institutions other than the 20 largest | 164,645.8 | 81.7 | 78,028.4 | 59,517.4 | 15,233.0 | 11,867.0 |

[a] The 20 responding institutions with the largest federally financed R&D expenditures in the life sciences in FY 1982.

## TABLE 11B

### Percentage Distribution of Research Support for Plant Biology, by Type of Institution and Source, FY 1983

| | All | Federal Government | State Government | Industry | Other |
|---|---|---|---|---|---|
| All institutions | 100% | 48.6 | 34.2 | 9.7 | 7.5 |
| Public institutions | 100 | 47.0 | 36.9 | 9.2 | 6.9 |
| Land-grant institutions | 100 | 43.9 | 40.1 | 8.9 | 7.1 |
| Private institutions | 100 | 69.8 | .2 | 15.4 | 14.6 |
| 20 largest institutions[a] | 100 | 54.1 | 25.7 | 11.5 | 8.7 |
| Institutions other than the 20 largest | 100 | 47.4 | 36.1 | 9.3 | 7.2 |

[a] The 20 responding institutions with the largest federally financed R&D expenditures in the life sciences in FY 1982.

# APPENDIX A: SURVEY INSTRUMENT

AMERICAN COUNCIL ON EDUCATION
ONE DUPONT CIRCLE
WASHINGTON, D. C. 20036

HIGHER EDUCATION PANEL
(202) 833-4757

October 6, 1983

Dear Higher Education Panel Representative,

Attached is Higher Education Panel Survey #62, "Plant Biology Training and Personnel." Sponsored by the National Science Foundation, its purpose is to obtain basic data concerning this emerging discipline.

Information is urgently needed for developing federal policy concerning plant biology. But it is a field in which little baseline data exist because it is composed of many subfields for which statistics are not separately identified and published. Thus, even the number of students, faculty, post-doctorates, and researchers in the field are not collected systematically or in such a way as to be identifiable with plant biology. This survey is designed to gather such data plus information on research support and opinions on the employment prospects of people trained in the field. Our pretest indicated strong interest in the survey on the part of plant biologists themselves.

You will note that this is a complex questionnaire and will require very specific, substantive knowledge of the discipline to complete. Consequently, instead of asking the HEP representative to determine the most appropriate respondent, the Foundation has requested that a specific individual act as plant biology coordinator on your campus. At your institution, the Foundation recommends that the survey be forwarded to:

If this person is no longer on your campus or is otherwise unavailable to act as coordinator, please designate an appropriate substitute, and let us know whom you select. We have included a preaddressed postcard for this purpose.

The importance of careful coordination for this particular survey cannot be overemphasized. We request that only one questionnaire be returned, and that it contain consolidated data from all of the units involved. The temptation to merely return a questionnaire for each department would severely diminish the usefulness of the effort, inasmuch as several questions require a single over-view of the entire effort at your institution. This is another reason that we are asking that the data be assembled by a specialist in the field.

Please understand that your institution's response will be protected to the maximum extent permissible by law. As with all our surveys, the data you provide will be reported in summary fashion only and will not be identifiable with your institution. This survey is authorized by the National Science Foundation Act of 1950, as amended. Although you are not required to respond, your cooperation is needed to make the results comprehensive, reliable, and timely.

Please have the completed questionnaire returned to us by October 31, 1983. A preaddressed envelope is enclosed for your convenience. If you have any questions or problems, please do not hesitate to telephone us collect at (202)833-4757.

Sincerely,

Frank J. Atelsek

Frank J. Atelsek
Panel Director

Enclosures

NATIONAL SCIENCE FOUNDATION
WASHINGTON, D.C. 20550

October 6, 1983

Dear Colleague:

I am writing on behalf of the National Science Foundation because we urgently need your assistance in completing the attached survey on plant biology training and personnel. We are sending it to 210 doctorate-granting institutions in the United States; thus it is not possible to contact each person individually. We hope you will understand and agree to serve as your institutions's coordinator.

The need for the survey derived from numerous studies and reports that recommend plant biology as an area for emphasis in upcoming federal budgets. The National Academy of Sciences Briefing Panel on Agricultural Research Opportunities identified plant biology specifically as a research area that is "likely to return the highest scientific dividends as a result of incremental federal investments." However, planning for such a major emphasis requires having at hand accurate information about the numbers and specialties of faculty, postdoctorates and graduate students in plant biology, the major areas of concentration of training and research, sources of support, estimates of faculty vacancies and employment prospects of plant biologists. Very little baseline data now exist because plant biology and its various subfields are not separately identified and published by extant data sources. Therefore, we at the National Science Foundation have asked the Higher Education Panel, a survey research program operated by the American Council on Education, to conduct this survey for us. We believe that the resultant information will be useful for federal agencies that support plant biology research and also universities, industry and professional societies.

As you read the eleven questions of the questionnaire you will understand why it is essential to have a plant biologist coordinate the data collection. As a plant biologist you can readily identify the various departments and research and teaching programs that involve plant biologists at your institution. Indeed, you will know that those programs and persons may reside in more than one college or division. We realize that the questionnaire is complex and that several items will require a substantial effort. However, we believe you will understand our objectives and will spend the time required to collect and aggregate your institution's data.

It is important for you to work with the Higher Education Panel Representative at your institution who forwarded the questionnaire. It will also probably be necessary for you to work with plant biologists in other departments to produce complete and accurate data. Remember it is important for the survey to include all appropriate plant biologists not just those in your department.

Please feel free to call the Higher Education Panel staff collect at (202) 833-4757 if there are any questions or problems.

Thank you for your assistance. We believe the goal will be worth our combined efforts.

Mary E. Clutter

Mary E. Clutter
Division of Physiology, Cellular
and Molecular Biology
National Science Foundation

AMERICAN
COUNCIL ON
EDUCATION

OMB #3145-0009
Exp. 6/30/84

Higher Education Panel Survey No. 62

# PLANT BIOLOGY TRAINING AND PERSONNEL

1. Please indicate the major administrative unit at your institution that is the primary focus for training graduate students in plant biology. *Check only one.*

___ a. Division/College of Arts and Sciences
___ b. School/College/Division of Agriculture/Forestry/Natural Resources
___ c. Other; specify. ____________________

**Please complete the remainder of this questionnaire with reference to *ALL* graduate plant biology personnel and training at your institution.**

2. Please list the department(s) involved in training graduate students in plant biology in 1982–83 at your institution. For each department, indicate (1) the total number of *plant biology* faculty and (2) the number of those faculty *engaged in training graduate students*. Count faculty members only once, i.e., with their major departmental affiliation.

If more than four departments are involved in training graduate students in plant biology, please list those in excess of four in the "Supplement" section on page 5.

| | | Number of Full-Time Plant Biology Faculty | |
|---|---|---|---|
| **Rank*** | **Department** | **Total** | **Training Graduate Students** |
| 1st | | | |
| 2nd | | | |
| 3rd | | | |
| 4th | | | |

*As measured by the number of full-time graduate students in plant biology.

3. Please show the number of full-time graduate students, Ph.D. recipients, postdoctoral fellows/associates, and faculty in your plant biology program(s). For 1982–83, categorize the data by sex; for 1983–84, show only estimated totals. Note that the 1982–83 totals for graduate students and postdoctorates should agree with corresponding totals in question 10.

| | 1982–83 | | | 1983–84 Total (Estimate) |
|---|---|---|---|---|
| | **Total** | **Males** | **Females** | |
| a. Full-time graduate students | ______** | | | |
| b. Ph.D. recipients (degrees awarded) | | | | |
| c. Postdoctoral fellows/associates | ______** | | | |
| d. Full-time faculty | | | | |

**These figures should agree with the corresponding totals in question 10.

4. Of the 1982–83 totals shown in the preceding question, how many were members of those racial/ethnic groups shown in "Definitions"? Include only *U.S. citizens* and non-citizens who have *permanent resident* status.

a. Full-time graduate students ____
b. Ph.D. recipients (degrees awarded) ____
c. Postdoctoral fellows/associates ____
d. Full-time faculty ____

5. How many *foreign* full-time graduate students and postdoctoral fellows/associates were in your 1982–83 plant biology program(s)? Please show men and women separately. Also show the total number of these individuals (men plus women) who were from *Developing Countries* (see "Definitions" for a list). **Count as foreign students and postdoctorates those non-U.S. citizens on temporary visas.**

| | Number of Men | Number of Women | Number from Developing Countries |
|---|---|---|---|
| a. Foreign graduate students | ____ | ____ | ____ |
| b. Foreign postdoctorates | ____ | ____ | ____ |

6. Indicate *in rank order* the three major disciplines that best characterize the areas of greatest concentration in your plant biology program(s) for (a) graduate students, (b) postdoctorates, and (c) faculty. Select a code from the list below and place it in the column that represents its appropriate rank.

| Type of Training/research | Highest Ranking Discipline | 2nd Highest Ranking Discipline | 3d Highest Ranking Discipline |
|---|---|---|---|
| a. Graduate student training | ____ | ____ | ____ |
| b. Postdoctoral research and training | ____ | ____ | ____ |
| c. Faculty research | ____ | ____ | ____ |

**DISCIPLINE CODES**

A. Agronomy/soil science
B. Anatomy/morphology
C. Biochemistry
D. Cell biology
E. Developmental biology
F. Ecology
G. Evolution
H. Forestry/natural resources
I. Genetics
J. Horticulture/crop science
K. Molecular biology
L. Plant pathology
M. Plant physiology
N. Systematics
O. Weed science
P. Other; specify. ____________
____________

7. For the *discipline ranked highest for graduate student training* in the preceding question, indicate those fields shown in the list below in which students *are required* to take courses—or to have taken courses during their undergraduate study.

____ a. Biochemistry

____ b. Genetics

____ c. Plant structure (anatomy/morphology)

____ d. Ecology/evolution

____ e. Plant physiology

8. Faculty vacancies in plant biology.

a. How many full-time faculty vacancies (budgeted positions) exist as of fall 1983 in all of your plant biology programs? ____

b. In which discipline is the need to fill vacancies greatest? Use a discipline code from question 6. ____

To what do you attribute this need? Check the *single most important*.

____ (1) Increased graduate enrollments

____ (2) Faculty retirements/departures

____ (3) Research opportunities

____ (4) Other; specify. ________________________________________

________________________________________

9. How would you characterize the "current market" for employment in plant biology?

In column 1, for each of the employment categories, enter the code for the discipline(s) in which there is a *surplus of positions*. Use discipline codes from question 6. A surplus of positions means a condition in which there are more positions available than trained people to fill them.

In column 2, for each of the employment categories, enter the code for the discipline(s) in which there is a *shortage of positions*. A shortage of positions means that there are not enough positions for all the qualified people who are applying for them.

If, in your opinion, there is a condition of equilibrium across all fields in any of the employment categories, enter a check mark in column 3.

| Employment Category | Column 1 Discipline(s) with *Surplus* of Positions | Column 2 Discipline(s) with *Shortage* of Positions | Column 3 Equilibrium Across Disciplines |
|---|---|---|---|
| a. Postdoctoral training positions | | | |
| b. Permanent doctoral research associate positions | | | |
| c. Tenure-track faculty positions | | | |
| d. Industrial positions | | | |
| e. Federal/state government positions | | | |

10. Show the number of full-time graduate students and postdoctoral fellows/associates in your plant biology program(s) by their *major* source of support. Count each individual only once. The totals should agree with the corresponding totals in question 3.

| Source | Graduate Students | Post-Doctorates |
|---|---|---|
| a. Federal fellowship | | |
| b. Federal research grant | | |
| c. State government | | |
| d. Foreign government | | |
| e. Institutional support | | |
| f. Industry | | |
| g. Other non-industry, non-personal support (foundations, associations etc.) | | |
| h. Personal funds | | |
| i. TOTAL | | |

These totals should agree with corresponding totals in question 3.

11. Indicate the amount of support for plant biology *research* that your institution received in FY 1982–83 from each of the sources listed below. If exact figures are not yet available, please show estimates. If a multi-year award was received in FY 1982–83, show only that portion that supported research conducted during the year.

| Source | Amount |
|---|---|
| a. Federal government | $ |
| b. State government | $ |
| c. Industry | $ |
| d. Other private support (foundations, associations, etc.) | $ |
| e. TOTAL | $ |

Thank you for your assistance. Please return this form by October 31, 1983 to:

Higher Education Panel
American Council on Education
One Dupont Circle Suite 829
Washington, DC 20036

Please keep a copy of this survey for your records.
Person completing form:

Name ____________________

Title ____________________

Telephone (     ) ____________________

If you have any questions or problems concerning this survey, please call the HEP staff collect at (202) 833-4757.

## Supplement to Question 2
## Additional Departments with Plant Biology Training for Graduate Students

If your institution has more than four departments involved in training graduate students in plant biology, continue below the list that was begun in question 2. For each department, indicate (1) the total number of *plant biology* faculty and (2) the number of those faculty *engaged in training graduate students*. Count faculty members *only once*, i.e., with their major departmental affiliation.

| | Number of Full-Time Plant Biology Faculty | |
|---|---|---|
| **Department** | **Total** | **Training Graduate Students** |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

### DEFINITIONS

### Developing Countries by Region

Latin America and the Caribbean: Includes Central America, Mexico, South America and the Caribbean

Far East, excluding Japan: Includes China, Burma, Thailand, the Philippines, Malaysia, Indonesia, and others

South Asia: Includes India, Afghanistan, Bangladesh, Pakistan, and Sri Lanka

Africa South of the Sahara *excluding* South Africa

Near and Middle East and North Africa: Includes Turkey, Iran, Saudi Arabia and other Middle East countries; included in North Africa are Morocco, Algeria, Tunisia, Libya, Egypt, Mauritania, Mali, Niger, Chad, and Sudan.

### Racial/ethnic Groups

American Indian/Alaskan Native
Black, non-Hispanic
Asian or Pacific Islander
Hispanic

### Full-time Faculty

Individuals with regular, full-time faculty appointments (both tenured and nontenured), *excluding* postdoctoral fellows/associates.

### Postdoctoral Fellow/associate

Individual with a doctorate (Ph.D, Sc.D., etc.) or with a professional degree (M.D., D.D.S., D.V.M., etc.) who, under temporary appointment carrying no academic rank, devotes full-time to research activities or study, usually for a specified period.

# APPENDIX B: TECHNICAL NOTES

The institutional population for this survey was defined to include institutions that had awarded five or more doctorates in 1980 in the arts and sciences and engineering combined. Excluded were doctorate-granting professional schools of medicine, allied health professions, business, law, fine and performing arts, and theology.

The questionnaire was mailed to a group of 209 institutions. Data received from returned questionnaires, supplemented by information obtained from follow-up telephone calls, degree-production records, and catalogs permitted the identification of 165 doctorate-granting institutions with graduate programs in plant biology. Of these 165 institutions, 143 responded to the survey questionnaire with substantive data, for an overall response rate of 87 percent.

At the time the survey was being initiated, the finishing touches were being put on the redesigned Higher Education Panel. Because there was a very high overlap of doctorate-granting institutions between the old and the new Panels, it was decided that the new Panel's weighting and institutional classification procedures should be used in calculating the national estimates. The following table shows the population and responses categorized according to the revised Panel stratification design.

**Weighting**

Data from the responding institutions were statistically adjusted to represent the population of doctorate-granting institutions with graduate plant biology programs. The weighting technique used was the standard one employed for Panel surveys. Data received from Panel members were adjusted for item and institutional nonresponse within each cell. Then institutional weights were applied to bring Panel data up to estimates representative of the national population.

**Comparison of Respondents and Nonrespondents**

Table B-2 compares survey respondents and nonrespondents on the basis of several variables. Higher-than-average response rates were recorded for institutions with large graduate enrollments and private institutions generally. Eastern and western institutions and those with graduate full-time-equivalent enrollments ranging from 2,000 to 5,000 students had lower-than-average response rates.

**Reliability of Survey Estimates**

Because the statistics presented in this report are based on a sample, they will differ somewhat from the figures which would have been obtained if a complete census had been taken using the same survey instrument, instructions, and procedures. As in any survey, the results are also subject to reporting and processing errors and errors due to nonresponse. To the extent possible, these types of errors were kept to a minimum by methods built into the survey procedures.

The standard error is primarily a measure of sampling variability--that is, the variations that might occur by chance because only a sample of the institutions is surveyed. The chances are about 90 out of 100 that an estimate from the sample would differ from a complete census by less than

Table B-1--Stratification Design

| Cell | Type of Institution | All Doctoral Institutions | Institutions with Graduate Plant Biology | |
|---|---|---|---|---|
| | | | Total | Respondents |
| | Total | 209 | 165 | 143 |
| 01 | Public doctorate-granting | 103 | 98 | 82 |
| 02 | Private doctorate-granting | 56 | 36 | 32 |
| 03 | Large public comprehensive (FTE >9,000) | 24 | 15 | 14 |
| 04 | Large private comprehensive (FTE >9,000) | 9 | 5 | 5 |
| 05 | Large public specialized | 1 | 1 | 1 |
| 06 | Large private specialized | 2 | -- | -- |
| 08 | Public comprehensive (FTE 5,000 - 9,000) | 2 | 2 | 2 |
| 09 | Public comprehensive (FTE <5,000) | 3 | 2 | 1 |
| 10 | Private comprehensive (FTE <9,000) | 7 | 4 | 4 |
| 16 | Medium to small private specialized | 2 | 2 | 2 |

Excludes institutions that awarded less than 5 doctorates in the arts and sciences and engineering combined in 1980 and doctorate-granting professional schools of medicine, allied health professions, business, law, fine and performing arts, and theology.

1.65 times the standard error; about 95 out of 100 that it would be less than 1.96 times the standard error; and about 99 out of 100 that it would be less than 2.5 times as large. Thus, knowing the standard error permits us to specify a range within which we can have a stated confidence that a given estimate would lie if a complete census, rather than a sample survey, had been conducted. As an example, refer to table B-3 to the estimated number of graduate students at all institutions--8,023. The 90 percent confidence interval for that item is plus or minus 616. Thus, chances are 90 out of 100 that a complete census would show the number of graduate students to be more than 7,407, and less than 8,639.

Table B-3 shows 90 percent confidence intervals of selected survey items for all institutions and for land-grant and private institutions separately.

Table B-2--Comparison of Respondents and Nonrespondents
(In percenteges)

| Institutional Characteristic | Respondents (N=143) | Nonrespondents (N=22) | Response Rate |
|---|---|---|---|
| Total | 100.0 | 100.0 | 86.7 |
| Control | | | |
| Public | 69.9 | 81.8 | 84.7 |
| Private | 30.1 | 18.2 | 91.5 |
| Region | | | |
| East | 18.9 | 27.3 | 81.8 |
| South | 34.9 | 22.7 | 90.9 |
| Midwest | 25.9 | 18.2 | 90.2 |
| West | 20.3 | 31.8 | 80.6 |
| Total graduate full-time equivalent enrollment (1980) | | | |
| Less than 1,000 | 28.7 | 18.2 | 91.1 |
| 1,000-1,999 | 33.5 | 27.3 | 88.9 |
| 2,000-4,999 | 30.1 | 50.0 | 79.6 |
| 5,000 and above | 7.7 | 4.5 | 91.7 |

Table B-3--Ninety Percent Confidence Intervals for Selected Survey Estimates

| | All Institutions | | Land-grant Institutions | | Private Institutions | |
|---|---|---|---|---|---|---|
| Item | Estimate | Confidence Intervals± | Estimate | Confidence Intervals± | Estimate | Confidence Intervals± |
| Graduate students | 8,023 | 616 | 6,442 | 585 | 375 | 44 |
| Ph.D.'s awarded | 925 | 98 | 740 | 113 | 57 | 10 |
| Postdoctorate fellows/associates | 1,009 | 111 | 731 | 131 | 138 | 21 |
| Full-time (program) faculty | 4,607 | 342 | 3,674 | 328 | 263 | 18 |
| Graduate students whose principal support came from: | | | | | | |
| State governments | 950 | 111 | 807 | 127 | a | a |
| Institutional funds | 2,400 | 169 | 1,664 | 175 | 195 | 20 |
| Postdoctoral fellows whose principal support came from: | | | | | | |
| State governments | 69 | 13 | 63 | 17 | a | a |
| Institutional funds | 75 | 11 | 52 | 13 | a | a |
| Research support[b] | | | | | | |
| Total | $201,569.6 | $20,221.6 | $166,993.9 | $22,520.1 | $14,610.1 | $2,122.5 |
| Federal | 97,988.3 | 9,567.0 | 73,339.8 | 10,965.1 | 10,213.6 | 1,678.1 |
| State | 69,023.7 | 9,530.1 | 66,938.8 | 11,525.8 | c | c |
| Industry | 19,486.4 | 2,100.6 | 14,842.2 | 2,339.6 | 2,242.7 | 486.7 |

a Estimate is less than 20; confidence interval not calculated.
b Estimates are in thousands of dollars.
c Estimate is less than $25,000; confidence interval not calculated.

# APPENDIX C

50 Institutions with the Largest
Federally Financed Research and Development Expenditures
in the Life Sciences, FY 1982

| Rank | Institution | Rank | Institution |
|---|---|---|---|
| 1 | University of California, San Francisco | 26 | University of Iowa |
| 2 | Johns Hopkins University | 27 | University of Southern California |
| 3 | University of Washington | 28 | University of Texas Health Science Center, Dallas |
| 4 | University of Minnesota | 29 | University of California, Berkeley |
| 5 | Harvard University | 30 | University of Connecticut |
| 6 | Columbia University, Main Division | 31 | University of Pittsburgh |
| 7 | Yale University | 32 | Boston University |
| 8 | University of Pennsylvania | 33 | Michigan State University |
| 9 | University of Wisconsin, Madison | 34 | University of Miami |
| 10 | Stanford University | 35 | University of Utah |
| 11 | University of California, Los Angeles | 36 | University of Arizona |
| 12 | Washington University | 37 | CUNY Mount Sinai School of Medicine |
| 13 | Yeshiva University | 38 | Massachusetts Institute of Technology |
| 14 | Cornell University | 39 | University of Florida |
| 15 | University of California, San Diegeo | 40 | Case Western Reserve University |
| 16 | University of Michigan | 41 | Ohio State University |
| 17 | Duke University | 42 | Oregon State University |
| 18 | University of Chicago | 43 | Pennsylvania State University |
| 19 | University of California, Davis | 44 | Virginia Commonwealth University |
| 20 | Baylor College of Medicine | 45 | Rockefeller University |
| 21 | New York University | 46 | Northwestern University |
| 22 | University of Rochester | 47 | Texas A & M University |
| 23 | University of Alabama, Birmingham | 48 | Emory University |
| 24 | University of North Carolina, Chapel Hill | 49 | Vanderbilt University |
| 25 | University of Colorado | 50 | University of California, Irvine |

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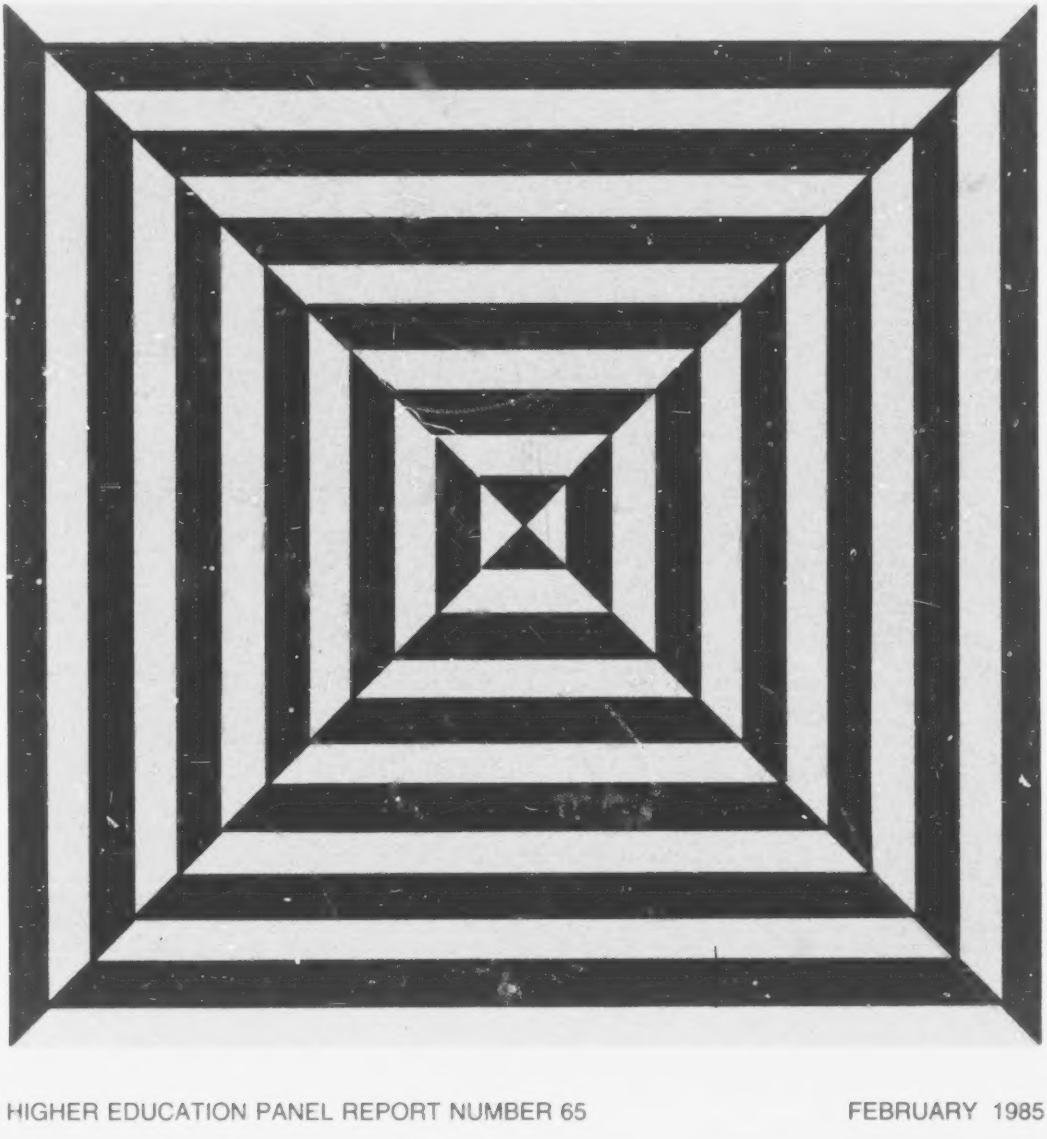
# CAMPUS TRENDS, 1984

Elaine El-Khawas



HIGHER EDUCATION PANEL REPORT NUMBER 65

FEBRUARY 1985

A Survey of the American Council on Education

# AMERICAN COUNCIL ON EDUCATION

**Robert H. Atwell,** President

The American Council on Education, founded in 1918, is a council of educational organizations and institutions. Its purpose is to advance education and educational methods through comprehensive voluntary and cooperative action on the part of American educational associations, organizations, and institutions.

The Higher Education Panel is a survey research program established by the Council for the purpose of securing policy-related information quickly from representative samples of colleges and universities. *Higher Education Panel Reports* are designed to expedite communication of the Panel's survey findings to policy-makers in government, in the associations, and in educational institutions across the nation.

The Higher Education Panel's surveys on behalf of the Federal Government are conducted under support provided jointly by the National Science Foundation, The National Endowment for the Humanities, and the U.S. Department of Education (NSF Contract SRS-8117037).

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A1410-1.19

# Campus Trends, 1984

Elaine El-Khawas

*Higher Education Panel Reports*
*Number 65 February 1985*

American Council on Education
Washington, D.C. 20036

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Data processing services for the survey were ably provided by Boichi San and Bernard Greene, ACE Division of Policy Analysis and Research. Irene L. Gomberg, former Assistant Director of the Higher Education Panel, was also involved in the development and design of this survey.

Special appreciation is extended to the Higher Education Panel campus representatives and academic officers who responded to the survey. Our hope is they will find the survey's results offer good perspective on present-day campus policies and practices.

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# HIGHLIGHTS

A June 1984 survey reveals that colleges and universities are giving considerable attention to the quality of the curriculum, to admissions and graduation requirements, and to programs and services responsive to a changing population of students. Key findings include:

- Almost all institutions are in the midst of curriculum change. About 6 in 10 are reviewing their curricula, and another 3 in 10 have just completed a review. New general education requirements are being developed, and greater attention is being paid to competencies and skills learned by students.
- Close to half of colleges and universities are reviewing or recently completed a review of admissions requirements, especially to raise or be more specific about requirements or to review the role of test scores in the admissions process.
- Four out of 10 institutions have institution-wide writing requirements for all of their students. Two-thirds of institutions require that all entering students take placement tests in mathematics and in English.
- Among four-year colleges and universities, about 2 in 10 require foreign language study as part of their graduation requirements for all students. Another 3 in 10 of these institutions have foreign language requirements for some students.
- Many institutions (62 percent) currently offer special programs focusing on student retention. Most (78 percent) also offer courses on "coping with college."
- Among colleges with teacher education programs, most (76 percent) report that they have tightened their standards in recent years.
- Close to half of all colleges and universities offer courses, both credit and noncredit, on business premises for business employees.
- About two-thirds of the nation's colleges and universities sponsor faculty development programs. Workshops or symposia are typical components of these programs, as are individualized approaches to faculty development.
- At about 4 in 10 institutions, administrators reported that levels of faculty morale and compensation were better than they were 5 years ago. Fewer than 1 in 5 said that morale and compensation levels had worsened.
- Administrators at 4 in 10 institutions also reported that relationships with state agencies were better than 5 years ago. Very few (3 percent) reported worsening relationships.

# BACKGROUND

This report marks the beginning of a new project of the Division of Policy Analysis and Research of the American Council on Education. The Campus Trends project is designed to provide the higher education community with timely overviews of trends apparent at colleges and universities throughout the nation. Its creation reflects the belief of the Council that information gathered periodically on recent and pending changes affecting academic institutions will strengthen the status of higher education in the community at large.

In this first report, a variety of policies and practices are described that were current at American colleges and universities in 1983–84. The broad area of curricular review is examined in the report, as are admissions and graduation requirements presently in effect. The report also offers information on such key issues as faculty hiring, morale, retirements, and related matters. In addition, college linkages with business and industry are detailed and the opinions of campus administrators are reported on a range of issues relating to their institutions.

# METHODS SUMMARY

The Higher Education Panel forms the basis of an ongoing survey research program created in 1971 by the American Council on Education. Its purpose is to conduct specialized surveys on topics of current policy interest to the higher education community and to government agencies.

The Panel is a disproportionate stratified sample of 1,040 colleges and universities, divided into two half-samples of 520 institutions each. Institutions were drawn from the more than 3,200 colleges and universities listed in the National Center for Education Statistics' *Education Directory, Colleges and Universities*. All institutions in the population are grouped according to the Panel's stratification design, which is based primarily upon institution type (doctorate-granting, comprehensive, baccalaureate, specialized, and two-year academic or occupational), control (public, private), and size (full-time-equivalent enrollment). For any given survey, either the entire Panel, a half-sample, or an appropriate subgroup is used.

The survey operation is dependent upon a network of campus representatives who, through their presidents, have agreed to participate. The representatives receive the Panel questionnaires and direct them to the most appropriate campus officials for response.

The survey sample consisted of all two-year colleges, four-year colleges, and universities in one of the half-samples. Excluded were specialized and religious institutions, which brought the total survey sample to 458 institutions. The questionnaire (see Appendix A) was mailed in two stages so that 15 percent of the institutions included in another HEP survey under way would not be unduly burdened. The first mailing went out in late June; the second followed a month later.

Senior administrative officials were asked to provide general information on campus trends in various areas, including course offerings, college costs, and requirements for admissions and graduation. In addition, they were queried on their opinions and judgments about recent changes affecting their institutions. After a series of mail and telephone follow-ups, usable responses were received from 413 institutions, or 90 percent of those surveyed.

Data from responding institutions were statistically adjusted (weighted) to represent 2,623 four- and two-year colleges and universities. (Institutional weights are based on the ratio of the number of respondents to the number of institutions in the population, separately for the strata used in the survey.)

The technical notes (see Appendix B) contain a description of the weighting methodology and comparison of respondents and nonrespondents.

# FINDINGS

A strong impression that emerges from the survey results is that higher education is in the midst of substantial curricular change. Colleges of all types are addressing the issue of new general education requirements and are giving greater emphasis to the competencies and skills learned by students. In addition, close to half of all colleges and universities are reviewing admissions requirements, especially with regard to raising their requirements, and reviewing the role of standardized test scores in the admissions process.

It also appears that many of the reforms of the last few years proposed for higher education have been adopted by higher education institutions. Four out of 10 institutions had college-wide writing requirements. Over half—55 percent—were reviewing their admissions requirements in order to include special procedures for older students. Two-thirds have faculty development programs. Most have some form of cooperation established with business and industry.

Problems and shortcomings are documented as well. Only a few institutions require either comprehensive exams in a student's major or study of a foreign language. At 1 in 5 colleges, equipment for teaching and research and the level of faculty compensation were judged to be worse than 5 years ago.

## Changes in the Curriculum

Most American colleges and universities were engaged in curriculum review during the past year (see figure 1). About 6 in 10 institutions were reviewing their curricula; another 3 in 10 had just completed a review.

At almost all institutions, this review involved new general education course requirements. Most institutions also reported giving greater emphasis to competencies and skills of students (see figure 2), which probably reflects a general focus on what students are learning, rather than any substantial move toward competency-based curricula.

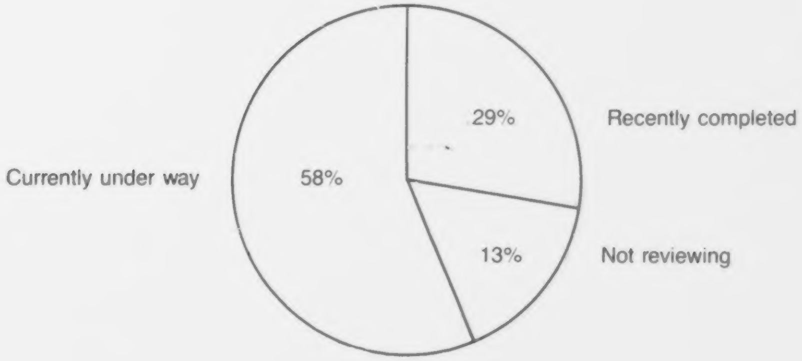
A number of differences by type of institution can be noted (see table A). Efforts to give greater flexibility to adult learners were reported by more than half of the two-year colleges, but by 4 in 10 of other colleges. Close to half of the four-year colleges and universities were giving greater attention to foreign language study; a much smaller proportion of two-year colleges were doing so. Another contrast appears with respect to career preparation interests of students: although 40 percent of universities were considering giving greater attention to career preparation in their curricular review, fully two-thirds of other colleges were doing so.

Detailed table 1 offers a look at a variety of special course and program offerings available in colleges and universities. The general picture is that practices vary substantially among institutions. Honors programs are offered by about half of all institutions, but by seven-eighths of the universities. While about 40

**FIGURE 1**

Status of Curricular Review, All Institutions

(N = 2,623)



Reference: Detailed table 2

**TABLE A—Areas of Curricular Review, by Type of Institution**
N = 2,289
(In percentages)

| | Two-year Institutions (N = 1,106) | Four-year Institutions (N = 664) | Universities (N = 519) |
|---|---|---|---|
| New general education requirements | 82 | 92 | 95 |
| Greater emphasis on competencies and skills | 90 | 89 | 85 |
| Increased course requirements | 45 | 59 | 61 |
| Greater flexibility for adult learners | 56 | 39 | 38 |
| Foreign language study | 21 | 49 | 45 |
| Career preparation | 63 | 71 | 41 |

Reference: Detailed table 2

percent of all institutions offer courses in international studies, only 24 percent of 4-year colleges and 31 percent of universities offer a major in this field.

Courses designed to help students with needed skills are frequently reported. More than 90 percent of all institutions have courses to improve writing skills of students; 78 percent reported courses on how to cope with or survive in college; 67 percent reported career planning courses; and 62 percent offer special programs focusing on student retention. Academic credit for remedial or developmental courses is offered by 60 percent of the institutions. In contrast, only a small number offer external degree programs (19 percent) or weekend colleges (16 percent).

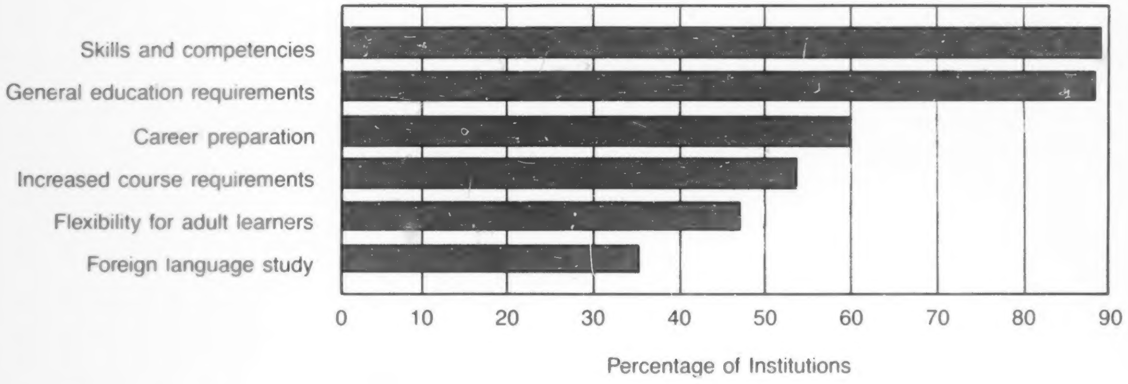
Detailed table 1 also documents that women's studies courses are offered by 42 percent of institutions, although very few (3 percent) offer it as a major. This pattern is also reflected in Black studies courses (7 percent offer a major, but 35 percent offer courses in the area), in Hispanic studies (6 percent offer a major, but 23 percent offer courses), and in Asian/Pacific American studies (4 percent offer a major, but 24 percent offer courses).

Teacher training has received a great deal of attention in the months following the release in April 1983 of the report of the National Commission on Excellence in Education, *A Nation at Risk* (published by the U.S. Department of Education). Questions in this survey obtained information on current or future requirements of teacher-training programs (see detailed table 3).

Close to 90 percent of four-year colleges and universities have teacher-training programs. Among these programs, the percentages reporting various selected characteristics were as follows:

| | Percentage of Institutions (N = 1,159) |
|---|---|
| A major or minor is required in a discipline for students in secondary education. | 92 |
| There are minimum requirements for entering the program. | 89 |
| The program has tighter standards now than a few years ago. | 76 |
| Special recruitment efforts are made to attract the best students. | 33 |
| The program includes a fifth year of study. | 12 |

**FIGURE 2**
Areas of Curricular Review
(N = 2,289)



Reference: Detailed table 2

Especially notable is the move toward tighter standards, reported by three-quarters of these programs. The survey also documents that students in secondary education are generally required to take subject-matter courses in a discipline, a fact that has often been overlooked in recent debate about the quality of teacher-training programs.

## Graduation Requirements

Many observers have argued that colleges today have few graduation requirements beyond a specified number of course credits that must be accumulated. Results of this study do not support such a simplistic view.

Almost all institutions require that a core amount of general education courses must be completed by some or all students (see figure 3). This is particularly true of four-year colleges and universities; among two-year institutions, 62 percent require core courses of all students, while another 25 percent require such courses of some students. In light of the general review of curriculum that is occurring at most institutions, these results are likely to change.

College practice varies considerably on other graduation requirements. Institution-wide writing requirements are quite prevalent, possibly a reflection of the efforts to strengthen "writing across the curriculum" during the last decade. Writing requirements for all students were reported by 60 percent of four-year colleges, 51 percent of universities, and by 26 percent of two-year institutions (see table B).

In contrast, relatively few institutions have foreign language requirements for all students for graduation. About 1 in 5 four-year colleges and universities do so, although another 28 percent impose such graduation requirements on some of their students (see detailed table 5).

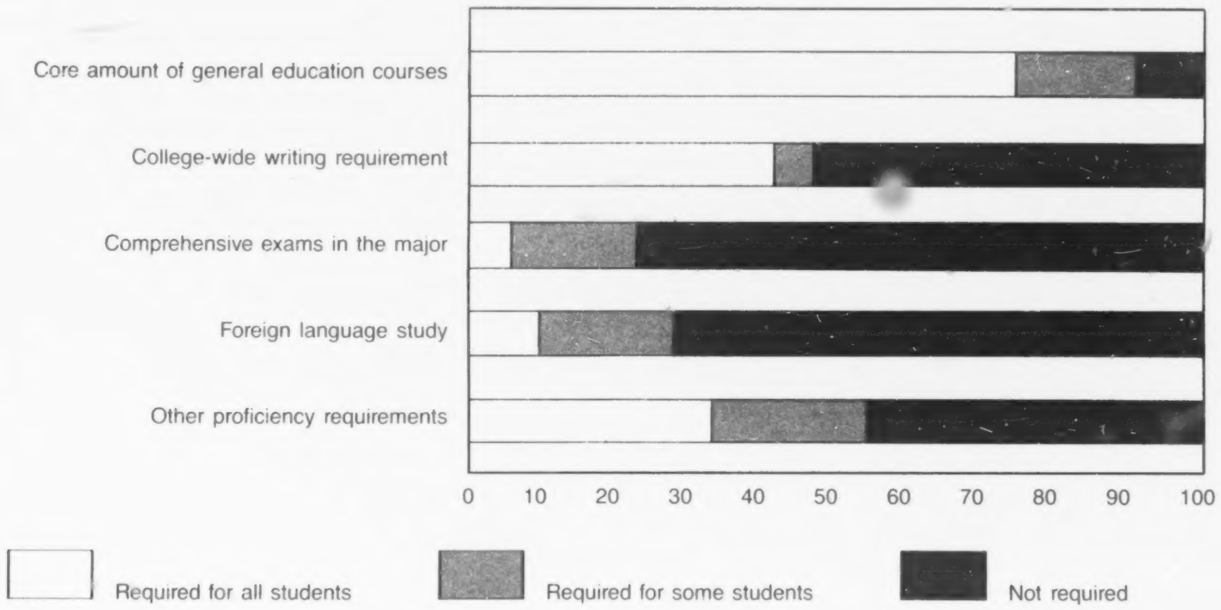
Comprehensive exam requirements in a student's major vary by type of institution. Few universities (3 percent) and a small number of four-year colleges (17 percent) require such exams of all students, but larger percentages (31 percent of universities and 21 percent of four-year colleges) reported that comprehensive exams are required of some students (see detailed table 5).

## Admissions Requirements

College admissions practices have also been subject to questioning since the release of *A Nation at Risk*. A major concern has been that admissions requirements are too lax.

**FIGURE 3**

Selected Graduation Requirements, All Institutions
(N = 2,623)



Reference: Detailed table 5

**TABLE B—College-wide Writing Requirements, by Type of Institution**

N = 2,623

(In percentages)

| | Two-year Institutions (N = 1,311) | Four-year Institutions (N = 739) | Universities (N = 573) |
|---|---|---|---|
| Required for *all* students | 26 | 60 | 51 |
| Required for *some* students | 8 | 3 | 9 |
| Not required | 66 | 37 | 40 |

Reference: Detailed table 5

Survey results show that just under two-thirds of the institutions require students to take placement tests (or otherwise meet requirements) in mathematics and just over two-thirds of the institutions require such tests in English (see figure 4). About one-fifth do not require all students to take such tests, but do require some students to meet basic requirements.

It also appears that a good many institutions are reviewing their admissions requirements in response to recent challenges. One-third overall were engaged in such a review at the time of the survey. Another 1 in 6 had recently completed a review. The primary areas for attention in these reviews were as follows: raising admissions requirements; reviewing the role of test scores; specifying courses needed for admissions; and developing special procedures for older students (see figure 5).

Compared to other types of institutions, two-year institutions were less likely to be specifying courses for admissions or otherwise raising requirements; however, they were more likely than others to be reviewing the role of test scores and considering special procedures for older students (see detailed table 4).

The perceptions of administrators of the quality of entering students were mixed. Over half reported that the ability to attract good students was better than 5 years ago. At the same time, just over half said that the general level of preparation of the entering students was "about the same" as 5 years ago. About 3 in 10 said that student preparation was better than it was 5 years ago (see detailed table 10).

## Easing the Burden of Tuition Costs

At a time when college costs have been rising somewhat ahead of inflation, colleges have developed a number of practices intended to ease the burden for families and students in meeting tuition costs. Extended payment plans are one example, in which payments for a year's tuition can be made on a monthly basis, extended over the full calendar year, or might be extended beyond graduation. Overall, 44 percent of all institutions have an extended payment plan (see detailed table 9).

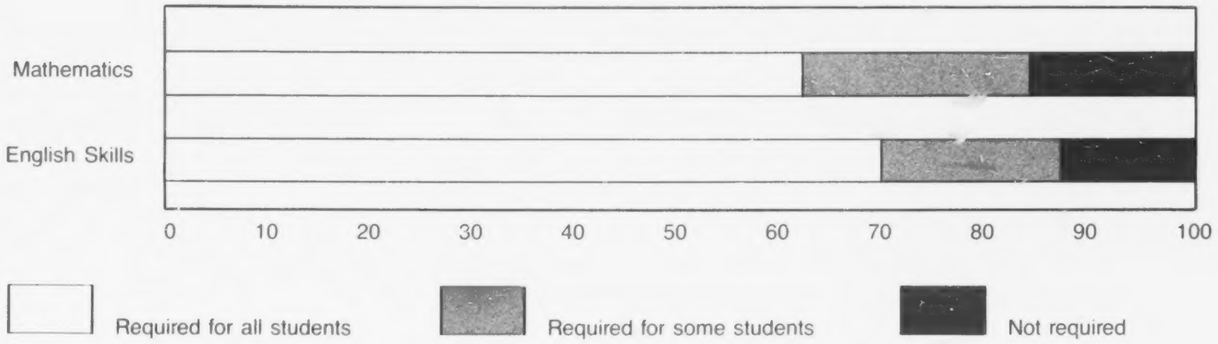
Another option is for a college or university to offer its own loan program, usually to supplement loan funds available through government-sponsored programs. One in 3 colleges offer such programs at present. Differential tuition rates have sometimes been introduced by institutions, in recognition that some degree programs are more costly than others. Study results indicate that relatively few institutions (7 percent) have such a fee structure in place.

There is new interest in offering merit scholarships, which generally are not based on financial need. In this survey, a question was asked about one form of such scholarships, where an award is made to stu-

**FIGURE 4**

Placement Tests for Entering Freshmen, All Institutions

(N = 2,623)

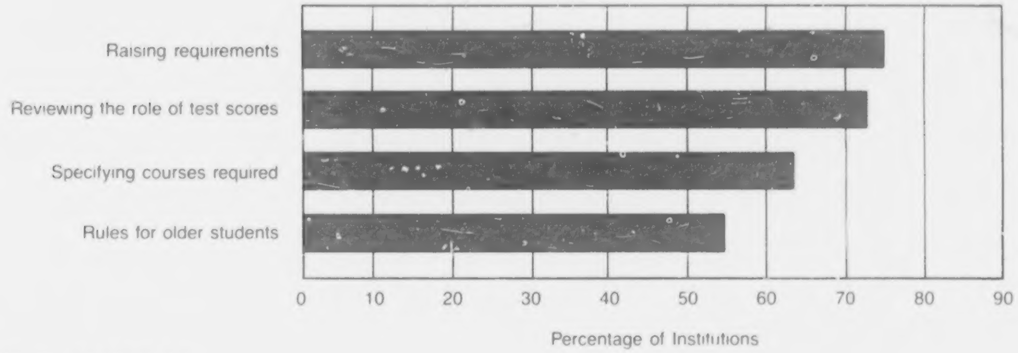


Reference: Detailed table 5

**FIGURE 5**

Areas of Admissions Requirements Review

(N = 1,247)



Reference Detailed table 4

dents that covers full tuition, room, and board. Results show that 30 percent of colleges offer such awards. It must be noted, however, that this figure may include athletic or artistic scholarships. To what extent is unknown.

## Faculty Matters

Financial pressures facing colleges and universities in recent years have sometimes led to faculty layoffs and, more frequently, to considerably reduced hiring of full-time faculty and greater use of part-time faculty. In addition, faculty salaries generally have not kept up with inflation.

Such circumstances provide the context for interpreting this study's results on collegiate hiring practices in 1983–84. Thus, for example, only one-third of institutions registered a net gain in full-time faculty positions compared to a year earlier, and 22 percent had a net loss in positions (see table C). Although most institutions did hire full-time faculty during the past year, such hiring apparently represents replacement of faculty who leave. It can be noted that, among the colleges that hired new faculty, most reported that women were among those hired and about one-third reported that Black or Hispanic faculty were hired. These figures reflect institutional experiences and could, therefore, represent the hiring of one minority or woman faculty member at an entire college or university (see detailed table 7).

**TABLE C—Number of Faculty Positions in 1983–84 Compared to a Year Earlier, All Institutions**

N = 2,623

(In percentages)

| | Two-year Institutions (N = 1,311) | Four-year Institutions (N = 739) | Universities (N = 573) |
|---|---|---|---|
| Net gain | 28 | 39 | 44 |
| Net loss | 25 | 22 | 17 |
| No change | 47 | 39 | 39 |

Reference: Detailed table 7

Extensive use of part-time faculty was found at two-year institutions and, to a more modest extent, at other institutions (see figure 6). Such use—defined here as involving part-time faculty in at least one-fourth of all courses—was reported by 61 percent of community colleges, by 21 percent of universities, and by 30 percent of four-year colleges.

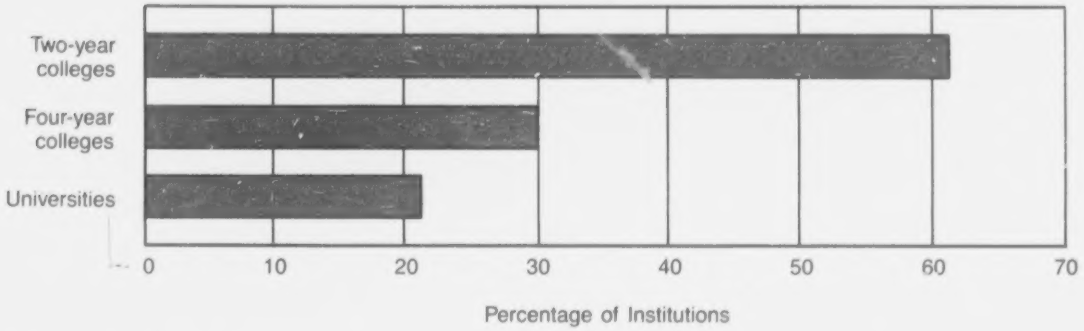
Study results also suggest that many colleges and universities have developed early retirement policies. About one-quarter of community colleges and four-year colleges reported that full-time faculty took early retirement during 1983–84; a much higher percentage of universities—68 percent—reported that full-time faculty took early retirement (see detailed table 7). This difference may be a function of size. Many universities are larger than baccalaureate institutions and would be more likely to have faculty eligible for early retirement.

About two-thirds of the nation's colleges and universities sponsor faculty development programs. For these programs, workshops appear to be a typical component (mentioned by 91 percent of institutions), while released time for faculty to develop new course material is provided at only about half of the institutions (see table D). Individualized approaches to faculty development are also quite common (mentioned by 74 percent of institutions).

Eighty-two percent of institutions reported procedures for periodic evaluation of tenured faculty (see detailed table 7). In a third of these cases, such evaluation is done less frequently than once a year. More detailed questions would be necessary to clarify the nature of such evaluations. It is possible that, in many institutions, such an evaluation is largely perfunctory.

**FIGURE 6**

Institutions Using Part-time Faculty Extensively, All Institutions
(N = 2,623)



Reference: Detailed table 7

The views of campus administrators on the level of faculty morale, compensation, and related matters were generally positive. About 4 out of 10 administrators felt that the overall level of both faculty morale and compensation was better during 1983–84 than it had been 5 years ago (see detailed table 10). Even so, about 1 in 5 said that compensation was worse than it had been 5 years ago. The institutions' ability to attract good faculty was assessed in similar terms: about half of the administrators thought it was the same as 5 years ago, 43 percent thought it was better, and only 6 percent thought their ability to attract good faculty was worse than before.

**TABLE D—Features of Formal Faculty Development Programs, by Type of Institution**
N = 1,731
(In percentages)

| | Two-year Institutions (N = 911) | Four-year Institutions (N = 486) | Universities (N = 334) |
|---|---|---|---|
| Workshops or symposia | 97 | 87 | 81 |
| Individualized approaches | 72 | 76 | 76 |
| Separate budget | 60 | 74 | 74 |
| Teaching improvement programs | 65 | 57 | 72 |
| Direction provided by coordinator | 58 | 59 | 69 |
| Released time for course development | 55 | 52 | 61 |

Reference: Detailed table 8

## Institutional Status

Several different survey items offer information on campus conditions and directions of activity (see detailed table 10). A majority of administrators (58 percent) said that the physical plant was in better condition than 5 years ago, although 12 percent said it was worse. Comments on the adequacy of equipment and library resources were less positive: about 4 in 10 thought conditions were better, and close to 2 in 10 thought that the condition of equipment and the library was worse than 5 years ago. Student aid was rated similarly: about 4 in 10 thought the adequacy of aid had improved, while 13 percent said it seemed worse (see table E).

When asked about how relationships with state agencies had changed, 4 in 10 administrators said that things were better than 5 years ago and very few—3 percent—reported worsening relationships. Regarding federal agencies, only one-quarter of administrators said that relationships were better than 5 years ago, although only 6 percent said things were worse.

Strong ties between business and higher education are also documented in the study findings (see table F). Joint meetings or advisory panels involving representatives of business and industry were reported at 7 in 10 institutions. Arrangements involving equipment (whether loaned, shared, or donated) are also quite common: they were reported at 65 percent of institutions. Half of the nation's colleges and universities report formal ties with business on scholarships or loan programs for students.

Many institutions offer courses—both credit and noncredit—for employees on business premises. Overall, just under half of all institutions reported such arrangements. Close to 60 percent of community colleges reported on-premise course offerings, while only one-quarter of four-year institutions had such offerings.

**TABLE E—Administrators' Views on Changes During the Last Five Years, All Institutions**
N = 2,623
(In percentages)

| | Direction of Change | | |
|---|---|---|---|
| | Better | Same | Worse |
| ***Students*** | | | |
| Ability to attract good students | 57 | 36 | 7 |
| General preparation of students | 29 | 53 | 18 |
| Job prospects for graduates | 40 | 49 | 11 |
| ***Faculty*** | | | |
| Overall faculty morale | 42 | 45 | 13 |
| Overall faculty productivity | 38 | 58 | 4 |
| Adequacy of faculty compensation | 44 | 38 | 19 |
| Ability to attract good faculty | 43 | 51 | 6 |
| ***Institutional Matters*** | | | |
| Relationships with state agencies | 45 | 51 | 3 |
| Relationships with federal agencies | 24 | 70 | 6 |
| Adequacy of student aid | 42 | 45 | 13 |
| Adequacy of equipment | 44 | 39 | 18 |
| Adequacy of library resources | 41 | 44 | 15 |
| Adequacy of physical plant | 58 | 30 | 12 |

Reference: Detailed table 10

Although relatively few institutions (18 percent) have formal ties with business involving research, 52 percent of universities have such ties. Shared or on-loan staff is generally infrequent with only 2 in 10 of all institutions indicating that kind of arrangement. However, 3 out of 10 universities reported such staff linkages.

Relatively small proportions of institutions reported offering programs that were jointly developed and sponsored with business or industry. Overall, 2 in 10 institutions reported having joint programs, including 26 percent of community colleges. While the percentages are small, these figures suggest that a large number of institutions were involved in joint degree programs with business during 1983–84: an estimated 100 universities, 69 four-year institutions, and 338 community colleges.

**TABLE F—Ties with Business and Industry, by Type of Institution, All Institutions**
N = 2,623
(In percentages)

| | Two-year Institutions (N = 1,311) | Four-year Institutions (N = 739) | Universities (N = 573) |
|---|---|---|---|
| Joint meetings or advisory panels | 79 | 58 | 75 |
| Equipment (loaned, shared or donated) | 64 | 59 | 74 |
| Scholarship or loan programs | 48 | 43 | 73 |
| Credit courses for employees | 59 | 26 | 49 |
| Noncredit courses for employees | 59 | 27 | 50 |
| Jointly sponsored degree programs | 26 | 9 | 17 |
| Shared or on-loan staff | 16 | 16 | 28 |
| Research | 6 | 13 | 52 |

Reference: Detailed table 6

## SUMMARY

This survey of various policies and practices at the nation's colleges and universities suggests that considerable attention is being paid to curriculum change and academic standards. It also gives evidence of the extent to which institutions, in the past, had responded to the diversity of students by imposing relatively few common requirements, beyond a core of general education, on all students.

The data also indicate that institutions are reexamining their graduation and course requirements, possibly to increase them. To be repeated in future years, the Campus Trends project should help document how these changes actually take place.

# DETAILED STATISTICAL TABLES

Readers should note that some percentage distributions in the following tables may not total to 100 because of weighting and rounding.

**TABLE 1—Institutions Offering Various Courses and Programs,**
***All Institutions***

| | Two-year Colleges | | Baccalaureates | | Universities | | All Institutions | |
|---|---|---|---|---|---|---|---|---|
| | 1311 | % | 739 | % | 573 | % | 2623 | % |
| Credit or noncredit courses: | | | | | | | | |
| 1. Improving writing skills | 1242 | 94.7 | 645 | 87.3 | 538 | 93.9 | 2425 | 92.5 |
| 2. Improving problem-solving | 794 | 60.5 | 433 | 58.6 | 349 | 60.9 | 1576 | 60.1 |
| 3. Career planning | 905 | 69.0 | 491 | 66.5 | 368 | 64.2 | 1764 | 67.3 |
| 4. Coping with college | 1056 | 80.5 | 551 | 74.5 | 436 | 76.1 | 2042 | 77.9 |
| 5. Using personal computers | 1100 | 83.9 | 526 | 71.2 | 422 | 73.7 | 2049 | 78.1 |
| The institution offers: | | | | | | | | |
| 1. An external degree program | 219 | 16.7 | 107 | 14.5 | 166 | 29.0 | 492 | 18.7 |
| 2. A weekend college program | 148 | 11.3 | 118 | 16.0 | 147 | 25.6 | 413 | 15.7 |
| 3. Honors courses, sections or programs | 423 | 32.3 | 436 | 59.0 | 488 | 85.2 | 1347 | 51.4 |
| 4. Special programs on student retention | 836 | 63.7 | 418 | 56.5 | 361 | 63.1 | 1615 | 61.6 |
| 5. Remedial/development courses | 939 | 71.6 | 355 | 48.1 | 282 | 49.3 | 1576 | 60.1 |
| Undergraduate courses, as a major: | | | | | | | | |
| 1. International studies | 38 | 2.9 | 174 | 23.5 | 179 | 31.2 | 390 | 14.9 |
| 2. National security issues | 26 | 2.0 | 0 | 0.0 | 9 | 1.6 | 36 | 1.4 |
| 3. Soviet studies | 6 | 0.5 | 43 | 5.8 | 102 | 17.8 | 151 | 5.8 |
| 4. Women's studies | 11 | 0.8 | 7 | 0.9 | 54 | 9.3 | 71 | 2.7 |
| 5. Black studies | 53 | 4.1 | 7 | 0.9 | 130 | 22.7 | 190 | 7.2 |
| 6. Hispanic studies | 12 | 0.9 | 49 | 6.7 | 83 | 14.6 | 145 | 5.5 |
| 7. Asian/Pacific-American studies | 13 | 1.0 | 19 | 2.5 | 68 | 11.8 | 100 | 3.8 |
| Undergraduate courses, but not as a major: | | | | | | | | |
| 1. International studies | 345 | 26.3 | 362 | 49.0 | 320 | 55.9 | 1027 | 39.2 |
| 2. National security issues | 131 | 10.0 | 209 | 28.3 | 283 | 49.3 | 622 | 23.7 |
| 3. Soviet studies | 139 | 10.6 | 350 | 47.4 | 289 | 50.4 | 778 | 29.7 |
| 4. Women's studies | 348 | 26.5 | 361 | 48.9 | 390 | 68.1 | 1099 | 41.9 |
| 5. Black studies | 249 | 19.0 | 382 | 51.7 | 273 | 47.7 | 904 | 34.5 |
| 6. Hispanic studies | 203 | 15.5 | 177 | 24.0 | 231 | 40.3 | 611 | 23.3 |
| 7. Asian/Pacific-American studies | 113 | 8.7 | 251 | 33.9 | 252 | 44.0 | 616 | 23.5 |

### TABLE 2—Curricular Review Experiences, *All Institutions*

| | Two-year Colleges | | Baccalaureates | | Universities | | All Institutions | |
|---|---|---|---|---|---|---|---|---|
| | 1311 | % | 739 | % | 573 | % | 2623 | % |
| Currently reviewing: | 805 | 61.4 | 387 | 52.3 | 326 | 56.9 | 1518 | 57.9 |
| Recently completed: | 301 | 22.9 | 277 | 37.5 | 193 | 33.7 | 770 | 29.4 |
| Current or recent review: | 1106 | 100.0 | 664 | 100.0 | 519 | 100.0 | 2288 | 100.0 |
| 1. New general education requirements | 906 | 81.9 | 607 | 91.5 | 491 | 94.8 | 2005 | 87.6 |
| 2. Greater emphasis on competencies & skills | 998 | 90.2 | 588 | 88.7 | 438 | 84.5 | 2024 | 88.5 |
| 3. An increase in course requirements | 502 | 45.4 | 392 | 59.1 | 318 | 61.3 | 1213 | 53.0 |
| 4. Greater flexibility for adult learners | 619 | 56.0 | 260 | 39.2 | 195 | 37.7 | 1075 | 47.0 |
| 5. New attention to foreign language study | 234 | 21.2 | 328 | 49.4 | 232 | 44.7 | 794 | 34.7 |
| 6. Greater attention to career preparation | 701 | 63.4 | 469 | 70.7 | 212 | 40.9 | 1382 | 60.4 |
| Currently under way: | 805 | 100.0 | 387 | 100.0 | 326 | 100.0 | 1518 | 100.0 |
| 1. New general education requirements | 679 | 84.3 | 336 | 87.0 | 308 | 94.5 | 1323 | 87.2 |
| 2. Greater emphasis on competencies & skills | 750 | 93.2 | 343 | 88.7 | 271 | 83.3 | 1365 | 89.9 |
| 3. An increase in course requirements | 400 | 49.6 | 227 | 58.6 | 200 | 61.5 | 826 | 54.5 |
| 4. Greater flexibility for adult learners | 492 | 61.1 | 124 | 32.1 | 138 | 42.2 | 754 | 49.7 |
| 5. New attention to foreign language study | 211 | 26.2 | 187 | 48.4 | 160 | 49.3 | 558 | 36.8 |
| 6. Greater attention to career preparation | 595 | 73.9 | 278 | 72.0 | 154 | 47.3 | 1027 | 67.7 |
| Recently completed: | 301 | 100.0 | 277 | 100.0 | 193 | 100.0 | 770 | 100.0 |
| 1. New general education requirements | 228 | 75.6 | 270 | 97.7 | 184 | 95.2 | 682 | 88.5 |
| 2. Greater emphasis on competencies & skills | 247 | 82.2 | 245 | 88.7 | 167 | 86.5 | 660 | 85.6 |
| 3. An increase in course requirements | 103 | 34.1 | 166 | 59.8 | 118 | 61.1 | 386 | 50.1 |
| 4. Greater flexibility for adult learners | 127 | 42.2 | 136 | 49.1 | 58 | 29.9 | 321 | 41.6 |
| 5. New attention to foreign language study | 24 | 7.9 | 141 | 50.9 | 72 | 37.1 | 236 | 30.6 |
| 6. Greater attention to career preparation | 106 | 35.1 | 191 | 69.0 | 58 | 30.0 | 354 | 46.0 |

### TABLE 3—Institutions with Teacher-training Programs, By Selected Characteristics

| | Two-year Colleges | | Baccalaureates | | Universities | | All Institutions | |
|---|---|---|---|---|---|---|---|---|
| | 1311 | % | 739 | % | 573 | % | 2623 | % |
| Institutions with: | 44 | 3.3<br>(100.0) | 647 | 87.5<br>(100.0) | 512 | 89.4<br>(100.0) | 1203 | 45.9<br>(100.0) |
| 1. Minimum requirements | 26 | 60.2 | 578 | 89.5 | 451 | 88.1 | 1056 | 87.8 |
| 2. Special recruitment efforts | 5 | 10.3 | 161 | 25.0 | 222 | 43.3 | 388 | 32.2 |
| 3. Tighter standards | 33 | 74.5 | 489 | 75.6 | 395 | 77.1 | 916 | 76.2 |
| 4. A required major/minor in a discipline | 26 | 60.2 | 622 | 96.1 | 448 | 87.5 | 1096 | 91.2 |
| 5. A fifth year of study | 0 | 0.0 | 50 | 7.8 | 85 | 16.7 | 136 | 11.3 |
| Institutions discussing instituting: | | | | | | | | |
| 1. Minimum requirements | 0 | 0.0 | 13 | 2.1 | 37 | 7.3 | 51 | 4.2 |
| 2. Special recruitment efforts | 26 | 60.2 | 176 | 27.2 | 120 | 23.3 | 321 | 26.7 |
| 3. Tighter standards | 9 | 20.6 | 64 | 9.8 | 25 | 4.9 | 98 | 8.1 |
| 4. A required major/minor in a discipline | 5 | 10.3 | 7 | 1.0 | 23 | 4.4 | 34 | 2.8 |
| 5. A fifth year of study | 0 | 0.0 | 68 | 10.5 | 91 | 17.8 | 159 | 13.2 |
| Institutions considering abolishing teacher-training programs | 0 | 0.0 | 13 | 2.0 | 18 | 3.6 | 31 | 2.6 |

### TABLE 4—Admissions Requirements Review Experiences

| | Two-year Colleges | | Baccalaureates | | Universities | | All Institutions | |
|---|---|---|---|---|---|---|---|---|
| | 1311 | % | 739 | % | 573 | % | 2623 | % |
| Currently reviewing admissions requirements: | 332 | 25.3 | 273 | 37.0 | 234 | 40.9 | 840 | 32.0 |
| Recently completed a review: | 135 | 10.3 | 125 | 16.9 | 147 | 25.7 | 407 | 15.5 |
| Currently reviewing: | 332 | 100.0 | 273 | 100.0 | 234 | 100.0 | 840 | 100.0 |
| 1. Raising admissions requirements | 151 | 45.4 | 217 | 79.2 | 216 | 92.2 | 583 | 69.5 |
| 2. Specifying courses for admissions | 142 | 42.7 | 137 | 50.1 | 202 | 86.0 | 480 | 57.2 |
| 3. Special procedures for older students | 210 | 63.3 | 125 | 45.9 | 113 | 48.3 | 449 | 53.5 |
| 4. Reviewing the role of test scores | 269 | 80.9 | 210 | 76.9 | 152 | 64.7 | 631 | 75.1 |
| Recently completed: | 135 | 100.0 | 125 | 100.0 | 147 | 100.0 | 407 | 100.0 |
| 1. Raising admissions requirements | 109 | 80.3 | 94 | 74.9 | 132 | 89.8 | 334 | 82.1 |
| 2. Specifying courses for admissions | 122 | 90.3 | 74 | 59.4 | 107 | 72.8 | 303 | 74.5 |
| 3. Special procedures for older students | 112 | 82.8 | 63 | 50.3 | 60 | 41.0 | 235 | 57.7 |
| 4. Reviewing the role of test scores | 110 | 81.2 | 81 | 65.2 | 77 | 52.3 | 268 | 65.9 |
| Currently reviewing or recently completed: | 467 | 100.0 | 398 | 100.0 | 381 | 100.0 | 1247 | 100.0 |
| 1. Raising admissions requirements | 259 | 55.5 | 310 | 77.9 | 348 | 91.3 | 917 | 73.6 |
| 2. Specifying courses for admissions | 264 | 56.5 | 211 | 53.0 | 308 | 80.9 | 784 | 62.9 |
| 3. Special procedures for older students | 323 | 69.0 | 188 | 47.3 | 173 | 45.5 | 684 | 54.9 |
| 4. Reviewing the role of test scores | 379 | 81.0 | 292 | 73.3 | 228 | 59.9 | 899 | 72.1 |

### TABLE 5—Admissions and Graduation Requirements, *All Institutions*

| | Two-year Colleges | | Baccalaureates | | Universities | | All Institutions | |
|---|---|---|---|---|---|---|---|---|
| | 1311 | % | 739 | % | 573 | % | 2623 | % |
| Requirements for all students: | | | | | | | | |
| 1. Placement test in: | | | | | | | | |
| A. Mathematics | 709 | 54.0 | 509 | 68.9 | 415 | 72.4 | 1632 | 62.2 |
| B. English skills | 752 | 57.4 | 596 | 80.6 | 483 | 84.3 | 1831 | 69.8 |
| 2. Foreign language study for: | | | | | | | | |
| A. Admissions | 0 | 0.0 | 81 | 11.0 | 104 | 18.1 | 185 | 7.0 |
| B. Graduation | 0 | 0.0 | 168 | 22.7 | 98 | 17.1 | 266 | 10.1 |
| 3. A core amount of general education courses | 810 | 61.8 | 676 | 91.5 | 494 | 86.3 | 1981 | 75.5 |
| 4. Comprehensive exams for a major | 0 | 0.0 | 124 | 16.8 | 19 | 3.4 | 143 | 5.5 |
| 5. Institution-wide writing requirements | 345 | 26.3 | 447 | 60.4 | 293 | 51.1 | 1084 | 41.3 |
| 6. Other proficiency requirements for graduation | 398 | 30.4 | 304 | 41.1 | 167 | 29.1 | 869 | 33.1 |
| Requirements for some students: | | | | | | | | |
| 1. Placement test in: | | | | | | | | |
| A. Mathematics | 379 | 28.9 | 124 | 16.8 | 74 | 12.9 | 577 | 22.0 |
| B. English skills | 358 | 27.3 | 38 | 5.1 | 46 | 7.9 | 442 | 16.8 |
| 2. Foreign language study for: | | | | | | | | |
| A. Admissions | 38 | 2.9 | 31 | 4.2 | 49 | 8.6 | 118 | 4.5 |
| B. Graduation | 135 | 10.3 | 181 | 24.4 | 185 | 32.3 | 501 | 19.1 |
| 3. A core amount of general education courses | 323 | 24.6 | 31 | 4.2 | 47 | 8.2 | 401 | 15.3 |
| 4. Comprehensive exams for a major | 144 | 11.0 | 157 | 21.3 | 177 | 30.8 | 477 | 18.2 |
| 5. Institution-wide writing requirements | 105 | 8.0 | 25 | 3.4 | 51 | 8.9 | 181 | 6.9 |
| 6. Other proficiency requirements for graduation | 303 | 23.1 | 141 | 19.1 | 149 | 25.9 | 592 | 22.6 |

## TABLE 6—Ties with Business and Industry. *All Institutions*

| | Two-year Colleges | | Baccalaureates | | Universities | | All Institutions | |
|---|---|---|---|---|---|---|---|---|
| | 1311 | % | 739 | % | 573 | % | 2623 | % |
| Formal ties with business/industry in: | | | | | | | | |
| 1. Shared or on-loan staff | 215 | 16.4 | 117 | 15.8 | 161 | 28.2 | 493 | 18.8 |
| 2. Research | 77 | 5.9 | 92 | 12.5 | 298 | 52.1 | 468 | 17.8 |
| 3. Equipment | 836 | 63.7 | 435 | 58.8 | 422 | 73.6 | 1692 | 64.5 |
| 4. Scholarship or loan programs | 633 | 48.3 | 317 | 42.9 | 418 | 73.0 | 1369 | 52.2 |
| 5. Joint meetings or advisory panels | 1032 | 78.7 | 427 | 57.7 | 431 | 75.2 | 1889 | 72.0 |
| 6. Credit courses for business employees | 772 | 58.9 | 189 | 25.5 | 280 | 48.8 | 1241 | 47.3 |
| 7. Noncredit courses for business employees | 777 | 59.3 | 201 | 27.2 | 285 | 49.7 | 1263 | 48.2 |
| 8. Jointly developed & sponsored degree programs | 338 | 25.8 | 69 | 9.3 | 100 | 17.4 | 506 | 19.3 |
| Formal ties under discussion: | | | | | | | | |
| 1. Shared or on-loan staff | 198 | 15.1 | 95 | 12.9 | 87 | 15.2 | 380 | 14.5 |
| 2. Research | 28 | 2.1 | 87 | 11.8 | 56 | 9.8 | 171 | 6.5 |
| 3. Equipment | 123 | 9.4 | 58 | 7.8 | 43 | 7.5 | 223 | 8.5 |
| 4. Scholarship or loan programs | 98 | 7.5 | 56 | 7.5 | 26 | 4.6 | 180 | 6.9 |
| 5. Joint meetings or advisory panels | 74 | 5.6 | 92 | 12.5 | 32 | 5.6 | 198 | 7.6 |
| 6. Credit courses for business employees | 165 | 12.6 | 100 | 13.5 | 86 | 15.0 | 351 | 13.4 |
| 7. Noncredit courses for business employees | 111 | 8.5 | 95 | 12.8 | 76 | 13.2 | 282 | 10.7 |
| 8. Jointly developed & sponsored degree programs | 191 | 14.6 | 69 | 9.4 | 77 | 13.5 | 338 | 12.9 |

## TABLE 7—Changes in Faculty Positions Between 1982–84 and Selected Faculty Policies and Practices

| | Two-year Colleges | | Baccalaureates | | Universities | | All Institutions | |
|---|---|---|---|---|---|---|---|---|
| | 1311 | % | 739 | % | 573 | % | 2623 | % |
| Faculty positions in 1983–84 compared to 1982–83: | | | | | | | | |
| 1. A net loss | 328 | 25.0 | 161 | 21.8 | 95 | 16.6 | 583 | 22.2 |
| 2. A net gain | 363 | 27.7 | 288 | 39.0 | 252 | 44.0 | 903 | 34.4 |
| 3. No change | 621 | 47.4 | 290 | 39.2 | 226 | 39.4 | 1137 | 43.3 |
| Institutions that make extensive use of part-time faculty: | 800 | 61.0 | 224 | 30.3 | 120 | 21.0 | 1145 | 43.7 |
| Institutions reporting full-time faculty who took early retirement: | 334 | 25.5 | 201 | 27.2 | 388 | 67.7 | 923 | 35.2 |
| Institutions reporting new full-time faculty hired in 1983–84: | 1073 | 81.8<br>(100.0) | 678 | 91.8<br>(100.0) | 565 | 98.7<br>(100.0) | 2316 | 88.3<br>(100.0) |
| 1. New women faculty | 969 | 90.3 | 604 | 89.1 | 543 | 96.0 | 2116 | 91.3 |
| 2. New Black or Hispanic faculty | 319 | 29.8 | 180 | 26.6 | 365 | 64.6 | 865 | 37.3 |
| Institutions that periodically evaluate tenured faculty: | 1117 | 85.2<br>(100.0) | 589 | 79.8<br>(100.0) | 437 | 76.3<br>(100.0) | 2143 | 81.7<br>(100.0) |
| 1. Yearly | 835 | 74.8 | 359 | 60.9 | 255 | 58.3 | 1449 | 67.6 |
| 2. Less frequently than yearly | 282 | 25.2 | 230 | 39.1 | 182 | 41.7 | 694 | 32.4 |

## TABLE 8—Institutions with Faculty Development Programs, By Program Characteristics

| | Two-year Colleges | | Baccalaureates | | Universities | | All Institutions | |
|---|---|---|---|---|---|---|---|---|
| | 1311 | % | 739 | % | 573 | % | 2623 | % |
| Institutions with a formal program: | 911 | 69.5<br>(100.0) | 486 | 65.7<br>(100.0) | 334 | 58.4<br>(100.0) | 1731 | 66.0<br>(100.0) |
| 1. Workshops or symposia | 884 | 97.0 | 424 | 87.3 | 271 | 81.2 | 1580 | 91.2 |
| 2. Teaching-improvement programs | 593 | 65.1 | 277 | 57.1 | 240 | 71.8 | 1110 | 64.1 |
| 3. Individualized approaches | 654 | 71.8 | 369 | 75.9 | 254 | 75.9 | 1277 | 73.7 |
| 4. A separate budget | 549 | 60.3 | 357 | 73.5 | 246 | 73.7 | 1153 | 66.6 |
| 5. A coordinator/coordinating committee | 527 | 57.9 | 288 | 59.3 | 230 | 68.8 | 1046 | 60.4 |
| 6. Released time to develop new course material | 501 | 54.9 | 252 | 51.9 | 203 | 60.8 | 956 | 55.2 |

## TABLE 9—Selected Policies of Institutions Offering College Tuition Payment Plans and Aid, *All Institutions*

| | Two-year Colleges | | Baccalaureates | | Universities | | All Institutions | |
|---|---|---|---|---|---|---|---|---|
| | 1311 | % | 739 | % | 573 | % | 2623 | % |
| Institutions that offer: | | | | | | | | |
| 1. Merit scholarships | 325 | 24.8 | 228 | 30.8 | 245 | 42.7 | 797 | 30.4 |
| 2. Own loan programs for parents/students | 395 | 30.1 | 229 | 31.1 | 240 | 42.0 | 865 | 33.0 |
| 3. Differential tuition rates | 38 | 2.9 | 92 | 12.5 | 48 | 8.4 | 179 | 6.8 |
| 4. An extended payment plan for tuition & fee | 419 | 32.0 | 469 | 63.5 | 268 | 46.9 | 1157 | 44.1 |

**TABLE 10—Administrators' Views of Changes During the Last Five Years,**
***All Institutions***

| | Two-year Colleges | | Baccalaureates | | Universities | | All Institutions | |
|---|---|---|---|---|---|---|---|---|
| | 1311 | % | 739 | % | 573 | % | 2623 | % |
| 1. Relationship with state agencies, Better | 606 | 46.2 | 306 | 41.5 | 274 | 47.8 | 1187 | 45.2 |
| Same | 639 | 48.8 | 432 | 58.5 | 277 | 48.3 | 1349 | 51.4 |
| Worse | 65 | 5.0 | 0 | 0.0 | 22 | 3.8 | 87 | 3.3 |
| 2. Relationship with federal agencies, Better | 297 | 22.6 | 185 | 25.0 | 163 | 28.4 | 644 | 24.5 |
| Same | 942 | 71.9 | 494 | 66.9 | 398 | 69.4 | 1834 | 69.9 |
| Worse | 72 | 5.5 | 60 | 8.2 | 12 | 2.2 | 145 | 5.5 |
| 3. Ability to attract good students, Better | 687 | 52.4 | 453 | 61.3 | 353 | 61.6 | 1493 | 56.9 |
| Same | 509 | 38.8 | 235 | 31.8 | 193 | 33.7 | 937 | 35.7 |
| Worse | 115 | 8.8 | 51 | 6.9 | 27 | 4.7 | 193 | 7.3 |
| 4. Ability to attract good faculty, Better | 467 | 35.6 | 386 | 52.2 | 274 | 47.8 | 1126 | 42.9 |
| Same | 765 | 58.3 | 316 | 42.7 | 255 | 44.5 | 1336 | 50.9 |
| Worse | 80 | 6.1 | 37 | 5.1 | 44 | 7.7 | 161 | 6.1 |
| 5. General preparation level, Better | 293 | 22.4 | 242 | 32.8 | 224 | 39.1 | 759 | 28.9 |
| Same | 751 | 57.3 | 356 | 48.2 | 292 | 51.0 | 1399 | 53.4 |
| Worse | 269 | 20.5 | 141 | 19.1 | 59 | 10.3 | 469 | 17.9 |
| 6. Job prospects for grads, Better | 547 | 41.7 | 276 | 37.4 | 233 | 40.7 | 1057 | 40.3 |
| Same | 600 | 45.7 | 370 | 50.1 | 313 | 54.6 | 1283 | 48.9 |
| Worse | 162 | 12.4 | 92 | 12.5 | 24 | 4.3 | 279 | 10.6 |
| 7. Overall faculty morale, Better | 511 | 39.0 | 367 | 49.7 | 228 | 39.8 | 1106 | 42.2 |
| Same | 589 | 45.0 | 321 | 43.5 | 268 | 46.9 | 1179 | 45.0 |
| Worse | 211 | 16.1 | 50 | 6.8 | 77 | 13.4 | 337 | 12.9 |
| 8. Overall faculty productivity, Better | 360 | 27.5 | 301 | 40.7 | 345 | 60.3 | 1006 | 38.4 |
| Same | 885 | 67.5 | 414 | 56.0 | 219 | 38.3 | 1518 | 57.9 |
| Worse | 66 | 5.1 | 24 | 3.3 | 8 | 1.4 | 98 | 3.8 |
| 9. Adequacy of faculty compensation, Better | 530 | 40.4 | 336 | 45.5 | 275 | 48.1 | 1141 | 43.5 |
| Same | 539 | 41.1 | 254 | 34.3 | 201 | 35.2 | 994 | 37.9 |
| Worse | 242 | 18.5 | 149 | 20.2 | 98 | 17.2 | 490 | 18.7 |
| 10. Adequacy of student aid, Better | 524 | 39.9 | 324 | 43.8 | 257 | 44.8 | 1104 | 42.1 |
| Same | 661 | 50.4 | 299 | 40.5 | 229 | 39.9 | 1188 | 45.3 |
| Worse | 127 | 9.7 | 116 | 15.8 | 91 | 15.8 | 334 | 12.7 |
| 11. Adequacy of equipment, Better | 589 | 44.9 | 333 | 45.1 | 221 | 38.6 | 1144 | 43.6 |
| Same | 504 | 38.4 | 296 | 40.1 | 213 | 37.3 | 1013 | 38.6 |
| Worse | 218 | 16.7 | 122 | 16.5 | 132 | 23.1 | 473 | 18.0 |
| 12. Adequacy of library resources, Better | 495 | 37.7 | 342 | 46.2 | 247 | 43.1 | 1083 | 41.3 |
| Same | 620 | 47.3 | 286 | 38.7 | 234 | 40.8 | 1140 | 43.5 |
| Worse | 197 | 15.0 | 105 | 14.2 | 92 | 16.1 | 394 | 15.0 |
| 13. Adequacy of physical plant, Better | 705 | 53.7 | 499 | 67.6 | 309 | 54.0 | 1513 | 57.7 |
| Same | 396 | 30.2 | 179 | 24.2 | 208 | 36.3 | 783 | 29.9 |
| Worse | 210 | 16.0 | 55 | 7.4 | 56 | 9.7 | 320 | 12.2 |

# APPENDIX A: SURVEY INSTRUMENT

**AMERICAN COUNCIL ON EDUCATION**
Higher Education Panel

June 26, 1984

Dear Higher Education Panel Representative,

Attached is Higher Education Panel Survey No. 65, a survey sponsored by the American Council on Education to obtain general information on campus trends in a number of different areas. The questionnaire was designed to elicit a snapshot view of recent or pending changes in a variety of institutional policies and practices affecting, among other things, course offerings, faculty, and admissions and graduation requirements.

You will note that this questionnaire does not seek numerical responses. Rather, it asks a series of general questions and in many instances seeks opinions and judgments about change. For this reason, we suggest that the survey be completed by a high-level administrative official with a broad view of the institution, preferably the academic vice president. As usual, however, we leave that decision to you.

Please understand that your institution's responses will be held in strict confidence. As with all our surveys, the data you provide will be reported in summary fashion only and will not be identified with your institution.

Please have the completed questionnaire returned to us by July 13, 1984. A preaddressed envelope is enclosed for your convenience. If you have any questions or problems, please do not hesitate to telephone us collect at 202/833-4757.

Sincerely,

Frank J. Atelsek

Frank J. Atelsek
Panel Director

Attachment

One Dupont Circle, Washington, D.C. 20036-1193 (202) 833-4757

AMERICAN COUNCIL ON EDUCATION

Higher Education Panel Survey Number 65

# CAMPUS TRENDS 1983–84

You will note that this questionnaire does not seek numerical responses; rather, it asks a series of general questions about policies and practices at your institution and seeks your opinions and judgments about change.

Please answer the following questions for academic year 1983–84.

## I. COURSE OFFERINGS

A. Does your institution offer credit or noncredit courses open to all students on:

| | Yes | No |
|---|---|---|
| 1. Improving writing skills | ☐ | ☐ |
| 2. Improving problem-solving or critical-thinking skills | ☐ | ☐ |
| 3. Career planning | ☐ | ☐ |
| 4. Coping with college (study skills, expectations, etc.) | ☐ | ☐ |
| 5. Using personal computers | ☐ | ☐ |

B. Does your institution offer:

| | Yes | No |
|---|---|---|
| 1. An External Degree program | ☐ | ☐ |
| 2. A Weekend College program (for degree study) | ☐ | ☐ |
| 3. Honors courses, sections or programs | ☐ | ☐ |
| 4. Special program(s) focusing on student retention | ☐ | ☐ |
| 5. Academic credit for remedial/developmental courses | ☐ | ☐ |

C. Are undergraduate courses offered in the following areas?

| | Yes, and as a major | Yes, but not as a major | No |
|---|---|---|---|
| 1. International studies | ☐ | ☐ | ☐ |
| 2. National security issues | ☐ | ☐ | ☐ |
| 3. Soviet (or Russian) studies | ☐ | ☐ | ☐ |
| 4. Women's studies | ☐ | ☐ | ☐ |
| 5. Black studies | ☐ | ☐ | ☐ |
| 6. Hispanic studies | ☐ | ☐ | ☐ |
| 7. Asian/Pacific-American studies | ☐ | ☐ | ☐ |

D. Does your institution have an undergraduate teacher training program?

☐ No
☐ Yes

If "yes:"

| 1. Does it include: | Yes | Under Discussion | No |
|---|---|---|---|
| a. Minimum requirements for entrance into the program | ☐ | ☐ | ☐ |
| b. Special recruitment efforts to attract the best students to teacher training | ☐ | ☐ | ☐ |
| c. Tighter standards now than a few years ago | ☐ | ☐ | ☐ |
| d. A required major/minor in a discipline (other than education) for students in secondary education | ☐ | ☐ | ☐ |
| e. A fifth year of study | ☐ | ☐ | ☐ |

2. Is your institution now considering the abolition of its undergraduate teacher training program?

☐ No
☐ Yes

E. Is a general review of curriculum under way or has one recently been completed?

☐ No
☐ Yes, currently under way (or ongoing)
☐ Yes, completed within the last five years

If "yes," does it address:

| | Yes | No |
|---|---|---|
| 1. New general education requirements | ☐ | ☐ |
| 2. Greater emphasis on competencies and skills | ☐ | ☐ |
| 3. An increase in course requirements | ☐ | ☐ |
| 4. Greater flexibility for adult learners | ☐ | ☐ |
| 5. New attention to foreign language study | ☐ | ☐ |
| 6. Greater attention to career preparation | ☐ | ☐ |

## II. COLLEGE COSTS—Does your institution offer:

| | Yes | No |
|---|---|---|
| 1. Merit scholarships covering full tuition, room and board | ☐ | ☐ |
| 2. Its own loan program for parents or students | ☐ | ☐ |
| 3. Differential tuition rates for different undergraduate fields of study | ☐ | ☐ |
| 4. An extended payment plan for tuition and fee payments | ☐ | ☐ |

## III. ADMISSIONS AND GRADUATION REQUIREMENTS

A. Is a review of admissions requirements currently under way or has one recently been completed?

☐ No
☐ Yes, currently under way (or ongoing)
☐ Yes, completed within the last five years

If "yes," does it address:

| | Yes | No |
|---|---|---|
| 1. Raising admissions requirements | ☐ | ☐ |
| 2. Specifying courses required for admissions | ☐ | ☐ |
| 3. Special procedures for adults and older students | ☐ | ☐ |
| 4. Reviewing the role of standardized test scores in the admissions process | ☐ | ☐ |

B. Which of the following are required (for undergraduates)?

| | Required for all students | Required for some students | Not required |
|---|---|---|---|
| 1. Entering students must take placement tests or otherwise meet requirements in: | | | |
| a. Mathematics | ☐ | ☐ | ☐ |
| b. English skills | ☐ | ☐ | ☐ |
| 2. Foreign language study is required for: | | | |
| a. Admissions | ☐ | ☐ | ☐ |
| b Graduation | ☐ | ☐ | ☐ |
| 3. Students must complete a core amount of coursework in general education | ☐ | ☐ | ☐ |
| 4. Students must take comprehensive exams to complete a major | ☐ | ☐ | ☐ |
| 5. Students must meet institution-wide writing requirements before graduation | ☐ | ☐ | ☐ |
| 6. Students must meet other proficiency requirements before graduation | ☐ | ☐ | ☐ |

## IV. FACULTY

A. Were any new full-time faculty hired in 1983–84?

☐ No
☐ Yes

If "yes," did this include:

| | Yes | No |
|---|---|---|
| 1. New women faculty | ☐ | ☐ |
| 2. New Black or Hispanic faculty | ☐ | ☐ |

B. Compared with a year earlier, do you estimate there was:

☐ A net loss in faculty positions
☐ A net gain in faculty positions
☐ No change in faculty positions

C. Was extensive use made of part-time faculty (i.e., for more than about one-fourth of courses)?

☐ No
☐ Yes

D. Does your institution have a formal faculty development program?

☐ No
☐ Yes

If "yes," does it include:

| | Yes | No |
|---|---|---|
| 1. Workshops or symposia | ☐ | ☐ |
| 2. Teaching-improvement programs | ☐ | ☐ |
| 3. Individualized approaches (assistance as needed or requested) | ☐ | ☐ |
| 4. A separate budget | ☐ | ☐ |
| 5. A coordinator or coordinating committee | ☐ | ☐ |
| 6. Released time for faculty to develop new course material | ☐ | ☐ |

E. Are tenured or senior faculty evaluated periodically?

☐ No
☐ Yes

If "yes," does this occur:

☐ Yearly
☐ Less frequently than yearly

F. Did any full-time faculty take early retirement (nondisability retirement earlier than your institutional norm) during 1983–84?

☐ No
☐ Yes

**SEE BACK PAGE**

## V. OPINIONS OF CHANGE—Compared with five years ago, how would you rate the following:

| | Better | About the same | Worse |
|---|---|---|---|
| 1. Your institution's relationships with state agencies | ☐ | ☐ | ☐ |
| 2. Your institution's relationships with federal agencies | ☐ | ☐ | ☐ |
| 3. Ability of your institution to attract good students | ☐ | ☐ | ☐ |
| 4. Ability of your institution to attract and hold good faculty | ☐ | ☐ | ☐ |
| 5. General level of preparation of your institution's entering students | ☐ | ☐ | ☐ |
| 6. Job prospects for this year's baccalaureate or associate degree recipients from your institution | ☐ | ☐ | ☐ |
| 7. Overall level of faculty morale at your institution | ☐ | ☐ | ☐ |
| 8. Overall level of faculty productivity at your institution in research, teaching, or public service | ☐ | ☐ | ☐ |
| 9. Adequacy of faculty compensation at your institution | ☐ | ☐ | ☐ |
| 10. Adequacy of student aid provided by your institution, including scholarships, fellowships, and loans | ☐ | ☐ | ☐ |
| 11. Adequacy of equipment for teaching and research at your institution | ☐ | ☐ | ☐ |
| 12. Adequacy of library resources at your institution | ☐ | ☐ | ☐ |
| 13. Adequacy of your institution's physical plant and overall campus appearance | ☐ | ☐ | ☐ |

## VI. BUSINESS AND INDUSTRY—Does your institution have formal ties with business or industry in any of the following areas:

| | Yes | Under Discussion | No |
|---|---|---|---|
| 1. Shared or on-loan staff | ☐ | ☐ | ☐ |
| 2. Research | ☐ | ☐ | ☐ |
| 3. Equipment (donations, loans, or shared use) | ☐ | ☐ | ☐ |
| 4. Scholarship or loan programs | ☐ | ☐ | ☐ |
| 5. Joint meetings or advisory panels | ☐ | ☐ | ☐ |
| 6. Credit courses for business employees at business locations | ☐ | ☐ | ☐ |
| 7. Noncredit courses for business employees at business locations | ☐ | ☐ | ☐ |
| 8. Jointly developed and sponsored degree program(s) | ☐ | ☐ | ☐ |

---

Thank you for your cooperation.

Please return this form by **July 13, 1984**, to:

Higher Education Panel
American Council on Education
One Dupont Circle, Suite 829
Washington, D.C. 20036

Please keep a copy of this survey for your records.

Name of Respondent ____________________

Department ____________________

Telephone ____________________

If you have any questions or problems concerning this survey, please call the HEP staff collect at (202) 833-4757.

# APPENDIX B: TECHNICAL NOTES

Data from the responding Panel institutions were statistically adjusted to represent all of the nation's colleges and universities except specialized and religious institutions. The stratification design for weighting follows.

The weighting technique used was the standard one employed for Panel surveys. Data received from Panel members were adjusted for item and institutional nonresponse within each cell. Then institutional weights were applied to bring the Panel data up to estimates representative of the national population.

Table B-2 compares survey respondents and nonrespondents against several variables. Higher-than-average response rates were recorded for private baccalaureate and private two-year institutions. Large doctorate-granting universities had lower-than-average response rates.

**TABLE B–1:—Stratification Design**

| Cell | Type of Institution | Enrollment | Population | Respondents |
|---|---|---|---|---|
| | Total | | 2,624 | 413 |
| 1 | Large public doctorate-granting | [a] | 104 | 44 |
| 2 | Large private doctorate-granting | [a] | 61 | 23 |
| 3 | Large public comprehensive | [a] | 92 | 41 |
| 4 | Large private comprehensive | [a] | 27 | 13 |
| 7 | Large public two-year | [a] | 43 | 20 |
| 8 | Public comprehensive | 5,500–8,999 | 56 | 14 |
| 9 | Public comprehensive | <5,500 | 108 | 20 |
| 10 | Private comprehensive | <9,000 | 126 | 22 |
| 11 | Public baccalaureate | <9,000 | 127 | 20 |
| 12 | Private baccalaureate | 1,350–8,999 | 166 | 25 |
| 13 | Private baccalaureate | <1,350 | 446 | 37 |
| 17 | Public two-year academic/comprehensive | 6,000–8,999 | 55 | 16 |
| 18 | Public two-year academic/comprehensive | 4,000–5,999 | 72 | 16 |
| 19 | Public two-year academic/comprehensive | 2,000–3,999 | 155 | 24 |
| 20 | Public two-year academic/comprehensive | <2,000 | 333 | 23 |
| 21 | Private two-year academic/comprehensive | <9,000 | 129 | 12 |
| 22 | Public two-year occupational | 2,500–8,999 | 63 | 14 |
| 23 | Public two-year occupational | <2,500 | 221 | 18 |
| 24 | Private two-year occupational | <9,000 | 240 | 11 |

[a] Institutions that meet one or more of the three following criteria: (a) total full-time equivalent (FTE) 1981 enrollment greater than 8,999; (b) FTE 1981 graduate enrollment greater than 749; (c) FY 1979 educational and general expenditures of $35 million or more.

**TABLE B–2:—Comparison of Respondents and Nonrespondents**

(In percentages)

| Control and Type of Institution | Respondents (N = 413) | Nonrespondents (N = 45) | Response Rate |
|---|---|---|---|
| Total | 100.0 | 100.0 | 90.2 |
| Control | | | |
| Public | 65.4 | 73.3 | 89.1 |
| Private | 34.6 | 26.7 | 92.3 |
| Type and control | | | |
| Large public doctorate-granting | 10.7 | 17.8 | 84.6 |
| Large private doctorate-granting | 5.6 | 15.6 | 76.7 |
| Public comprehensive | 18.2 | 24.4 | 87.2 |
| Private comprehensive | 8.5 | 4.4 | 94.6 |
| Public baccalaureate | 4.8 | 4.4 | 90.9 |
| Private baccalaureate | 15.0 | 4.4 | 96.9 |
| Public two-year | 31.6 | 26.8 | 91.6 |
| Private two-year | 5.6 | 2.2 | 95.8 |

# ACE Board of Directors

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# GENERAL EDUCATION REQUIREMENTS IN THE HUMANITIES

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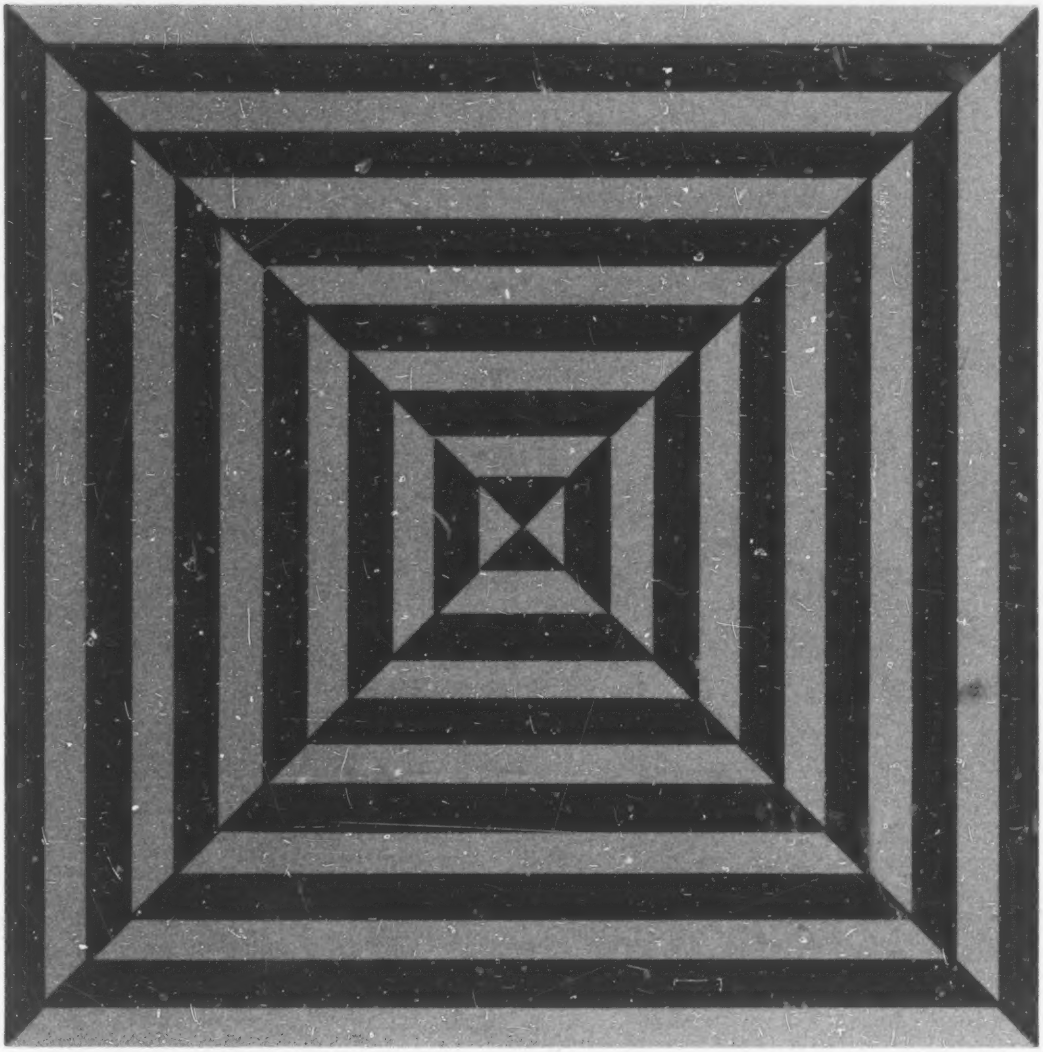

HIGHER EDUCATION PANEL REPORT NUMBER 66
AMERICAN COUNCIL ON EDUCATION

OCTOBER
1985

A Survey Funded by the National Science Foundation, the U.S. Department of Education, and the National Endowment for the Humanities

# AMERICAN COUNCIL ON EDUCATION

**Robert H. Atwell,** President

The American Council on Education, founded in 1918, is a council of educational organizations and institutions. Its purpose is to advance education and educational methods through comprehensive voluntary and cooperative action on the part of American educational associations, organizations, and institutions.

The Higher Education Panel is a survey research program established by the Council for the purpose of securing policy-related information quickly from representative samples of colleges and universities. *Higher Education Panel Reports* are designed to expedite communication of the Panel's survey findings to policy makers in government, in the associations, and in educational institutions across the nation.

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# General Education Requirements in the Humanities

Nancy Suniewick
Elaine El-Khawas

*Higher Education Panel Reports*
*Number 66 October 1985*

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Washington, D.C. 20036

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# HIGHLIGHTS

Results of a spring 1984 survey offer the following information about the nature of general education requirements at American colleges and universities.

- Almost all collegiate institutions in the U. S. required that some general education courses be taken by all of their degree candidates. On average, 45 (semester) hours of general education were required in four-year programs and 29 hours of general education were required in two-year degree programs.

- In most institutions, students had to meet these general education requirements by choosing from a limited range of courses designated by the college. Compared to five years ago, fewer colleges offered students an unlimited range of choices, and significantly more required that students choose from a limited range of courses.

- English composition was clearly a core subject, required for all degree candidates by about 9 in 10 institutions. No other humanities subject area reached such a level of broad consensus across institutions.

- Baccalaureate colleges were distinctive in showing a stronger pattern of humanities requirements than were other institutions. In addition to requirements in English composition, about half of baccalaureate colleges required all students to take courses in English or American literature, in world civilization, and in philosophy.

- Relatively few American colleges and universities required that all of their degree students take courses covering such traditional topics as ancient or medieval European history, the literature and philosophy of ancient Greece and Rome, or European history since the Renaissance. Rare too were any institution-wide requirements for courses on the literature, history, or cultures of Africa or Asia.

- About two-thirds of institutions relied on textbooks and other secondary sources in their humanities courses that were part of general education requirements. Such practices were more prevalent among public than among private institutions. At least half of institutions, and particularly private institutions, required students in such courses to read selections from primary texts. About 4 in 10 institutions required that primary texts be read in their entirety. Again, such practice was more prevalent among private than public institutions.

- Almost half of four-year institutions had foreign language requirements for all undergraduates. Private institutions had such institution-wide requirements more often than public institutions.

- Although there were some differences by control and type of institutions, the predominant approach to the teaching of expository writing at four-year institutions involved a special composition program for undergraduates. About half of institutions had a writing laboratory. About 4 in 10 institutions had a "writing across the curriculum" program. At two-year institutions, the predominant approach was to offer expository writing only through the English department.

- At the time of the survey, about half of the nation's colleges and universities were engaged in a process of restructuring their general education requirements.

# BACKGROUND

In the spring of 1984, the National Endowment for the Humanities asked the Higher Education Panel to undertake a survey of general education requirements in the humanities. The purpose of the survey was to determine the status of the humanities in the undergraduate curricula of the nation's colleges and universities. Results of the survey would aid the Endowment in designing grant programs to strengthen undergraduate teaching and learning in the humanities.

# METHODS SUMMARY

The Higher Education Panel forms the basis of a continuing survey research program created in 1971 by the American Council on Education. Its purpose is to conduct surveys on topics of current policy interest to the higher education community and to government agencies.

The Panel is a disproportionate stratified sample of 1,040 higher education institutions (divided into two half-samples of 520 institutions each) drawn from the population of more than 3,200 colleges and universities listed in the National Center for Education Statistics' *Education Directory, Colleges and Universities*. All institutions in the population are grouped according to the Panel's stratification design, which is based on institution type (doctorate-granting, comprehensive, baccalaureate, specialized, and two-year academic or occupational), control (public, private), and size (full-time-equivalent enrollment). For any given survey, either one of the half-samples, or an appropriate subgroup of the full Panel is used.

The survey operation depends on a network of campus representatives at the Panel institutions whose presidents have agreed to participate. The representatives receive the Panel questionnaires and direct them to the most appropriate campus officials for response.

The survey sample for this study consisted of the two-year colleges, four-year colleges, and universities in one half-sample. Excluded were institutions offering only graduate degrees and such specialized institutions as religious schools, schools of medicine, allied health services, business, and law, and four-year schools of the studio and performing arts.

A field test of the survey instrument was conducted in April 1984. The final version of the survey was mailed in two stages to avoid overlap with a previous survey. The first mailing occurred July 11, 1984; the second was sent July 25. A series of mail and telephone follow-ups to nonrespondents, supplemented by information from institutional catalogues, resulted in usable responses from 374 of the 454 eligible institutions surveyed, for an 84 percent response rate.

Data from the responding institutions were statistically weighted so that the results reflect the national population of 2,566 colleges and universities offering four-year and two-year degrees. (Institutional weights are based on the ratio of respondents to the number of institutions in the eligible population, separately for each stratum).

Appendix A includes a facsimile of the survey. Appendix B includes a description of the stratification design used to produce the national estimates, a comparison of respondents and nonrespondents according to various institutional characteristics, and an explanation of the reliability of the survey estimates.

# FINDINGS

## Overview

This report offers a detailed look at the extent to which American colleges and universities have general education requirements in the humanities.[1] This involves coursework that each institution has deemed to cover the "core" subjects that all undergraduate students should learn, regardless of their major. Survey results suggest that, overall, the humanities had a limited role in such requirements beyond the English composition courses that almost all institutions required.

The report describes the pattern of institutional requirements in several other areas, including foreign language proficiency, skills in library research, and expository writing. It also documents that a good many colleges and universities were reexamining and restructuring their general education requirements. The possible direction of such change is suggested by other information on changes in policy over the last five years, including evidence of increased credit-hour requirements in certain subjects and some movement away from allowing a wide range of choices for meeting general education requirements.

The report describes practices affecting four-year programs offered by doctoral, comprehensive, and baccalaureate institutions. A separate section describes general education requirements at two-year institutions. Comparisons between public and private institutions are made on most topics.

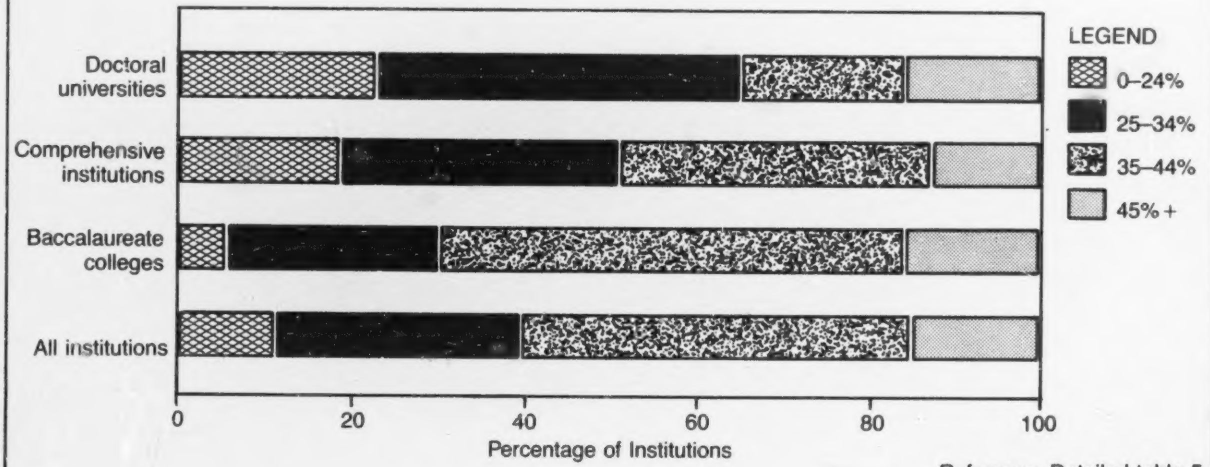
Readers should note that this survey focuses only on those institution-wide requirements that apply to *all* degree candidates. At a four-year institution, such requirements would affect students enrolled in schools of education, business, engineering, and other specializations as well as students enrolled in a school of liberal arts. At a two-year college, these requirements would be applicable to students enrolled both in associate of arts and associate of science degree programs. As will be seen, doctoral and comprehensive institutions had relatively few institution-wide requirements in the humanities. Baccalaureate colleges, in contrast, were more likely to have general requirements in humanities subjects for all of their students.

---

[1] For the purpose of this survey, general education is defined as the part of the curriculum that all undergraduates are required to take, regardless of major, in order to graduate. It generally includes study in the humanities (e.g., English, literature, foreign language, history, philosophy, and other disciplines) and in other liberal arts subjects (e.g., social sciences, mathematics, and natural and physical sciences).

**FIGURE 1**

Hours of General Education as a Percentage of Total Graduation Hours, Four-year institutions 1984–85



Reference: Detailed table 5

## General Education Requirements at Four-year Institutions

In 1984–85, almost all of the four-year institutions in the U. S. (96 percent) required *all* degree candidates to take some general education courses to graduate. On average, a minimum of 45 semester hours of general education were required out of a total of 125 hours needed for graduation[2] (see detailed table 4).[3] Thus, about a third of the total graduation credits involved general education.

These averages mask some important institutional differences, however. As figure 1 shows, a substantial percentage of doctoral universities required that one-quarter or less of a student's total credit hours be in general education. In contrast, most baccalaureate colleges mandated that one-third or more of a student's total credit hours be taken in general education.

Some modest increases can be noted between 1979–80 and 1984–85 in the average hours required in general education (see detailed table 4). The net result was that slightly more hours of general education were required in 1984–85 in relation to total graduation hours.

To fulfill their general education requirements in 1984–85, most students had to choose from a limited range of general education courses. Almost 9 out of 10 institutions followed this approach (see table A), and usually they specified departmental-level courses (e.g., history 101) that could be selected. In contrast, a minority of colleges and universities allowed students to fulfill requirements from an unlimited range of courses or through interdisciplinary or interdepartmental courses.

In fact, there has been some movement away from allowing students unlimited choice in fulfilling general education requirements. Compared to 1979–80, a higher percentage of institutions now specify a limited range of courses that meet general education requirements.

**Requirements in the Humanities.** The survey also requested information on the minimum number of credit hours required in twelve academic areas, including humanities and other subjects. As expected, requirements varied widely. Among the humanities, only English composition emerged as a core subject, and was required for all degree candidates by about 9 in 10 institutions. No other humanities subject came near this level of use (see figure 2). The picture that emerges is one of relatively little uniformity across institutions on the humanities subject areas that all students must cover in order to graduate.

Among the non-humanities subjects, social sciences were required by over 7 in 10 institutions, natural and physical sciences by 6 in 10, and mathematics by at least one-half (see figure 3 and detailed table 8). In addition, another 2 in 10 indicated that they may require coursework either in natural and physical sciences or in mathematics. Since detailed information was not requested, it is not possible to determine the degree of uniformity in coursework requirements outside the humanities.

There was more uniformity in general education requirements in baccalaureate colleges than in doctoral or comprehensive universities. In a departure from the overall pattern, a majority of baccalaureate colleges required that all of their students complete coursework in English or American literature, world civilization, other humanities, and mathematics. Three in 10 baccalaureate colleges also had general requirements in the arts. These requirements were in addition to required coursework in English composition, social science, natural and physical science, and mathematics. Further, among private baccalaureate

**TABLE A—Type of General Education Requirements, 1984–85 and 1979–80**

(Percentage of Institutions)

| | Doctorate (N = 163) | | Comprehensive (N = 399) | | Baccalaureate (N = 708) | |
|---|---|---|---|---|---|---|
| | 1984–85 | 1979–80 | 1984–85 | 1979–80 | 1984–85 | 1979–80 |
| Specified departmental courses | 63 | 58 | 79 | 78 | 83 | 79 |
| Specified interdisciplinary or interdepartmental courses | 15 | 9 | 34 | 28 | 31 | 27 |
| Limited range of courses | 85 | 63 | 87 | 76 | 87 | 70 |
| Virtually unlimited range of courses | 22 | 37 | 15 | 19 | 13 | 22 |

Reference: Detailed table 2

Note: Respondents were asked to indicate *all* items that applied to their institution's general education requirements. Thus, the columns do not sum.

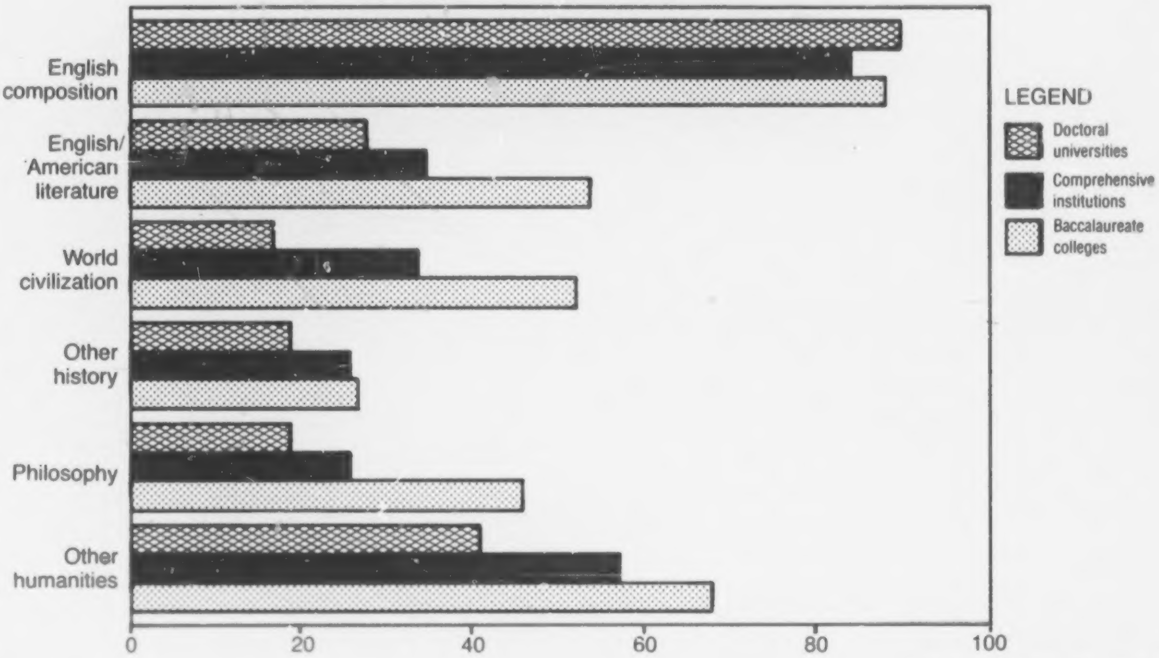
---

[2] All credit-hour data from institutions on the quarter system were converted to semester hours by the following formula: 1 quarter hour × ⅔ = 1 semester hour.

[3] Detailed tables are found in a separate section following the summary.

## FIGURE 2

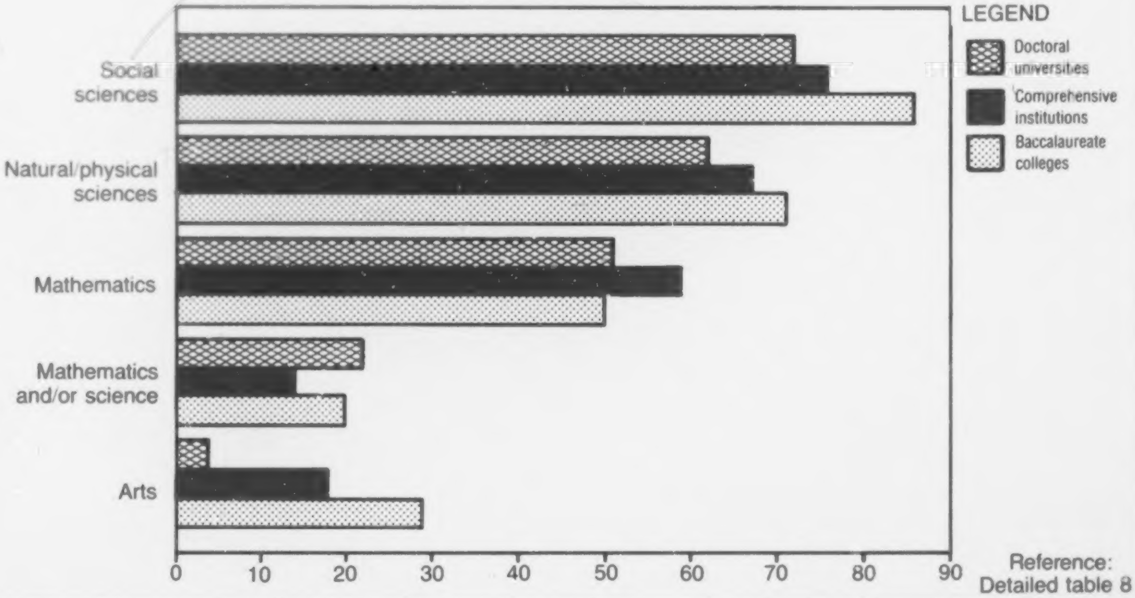
Percentage of Four-year Institutions Requiring Coursework in Selected Humanities Fields, 1984–85



Reference: Detailed table 8

## FIGURE 3

Percentage of Four-year Institutions Requiring Coursework in Selected Nonhumanities Fields, 1984–85



Reference: Detailed table 8

**TABLE B—Average Minimum Number of Credit Hours in Selected Humanities Fields, 1984–85**

| | Doctorate Institutions (N = 156) | Comprehensive Institutions (N = 366) | Baccalaureate Institutions (N = 694) |
|---|---|---|---|
| English composition | 6 | 5 | 5 |
| English/American literature | 5 | 5 | 4 |
| World civilization | 6 | 6 | 4 |
| Other history | 4 | 5 | 4 |
| Philosophy | 4 | 5 | 4 |
| Classics | 0 | 1 | 3 |
| Other humanities | 8 | 7 | 9 |
| Combination of humanities | 10 | 11 | 13 |
| Humanities and/or choice of other subjects | 19 | 16 | 10 |

Reference: Detailed table 7

Note: Averages are based on responses of all institutions in each category, including those with no minimum requirements in a field. If the averages were based only on institutions *with* minimum requirements, these averages would be higher. In particular, these averages understate the minimum hours required in fields where only a small percentage of institutions have minimum requirements.

colleges, 54 percent mandated a minimum number of credit hours in philosophy and 4 in 10 mandated coursework in a foreign language.

The survey also offers evidence of a gradual movement toward subject-area requirements between 1979–80 and 1984–85. Although most differences are small, this trend appears in almost all subjects and for each type of institution. The most dramatic increases occurred among baccalaureate colleges, especially for world civilization (required by 52 percent, up from 33 percent) and mathematics (50 percent, up from 33 percent). Increases are also notable in English or American literature, philosophy, and foreign languages (see detailed tables 8 and 8.1).

**TABLE C—Average Minimum Number of Credit Hours in Selected Nonhumanities Fields, 1984–85**

| | Doctorate Institutions (N = 156) | Comprehensive Institutions (N = 366) | Baccalaureate Institutions (N = 694) |
|---|---|---|---|
| Social Sciences | 8 | 8 | 8 |
| Natural and physical sciences | 9 | 7 | 7 |
| Mathematics | 5 | 4 | 4 |
| Mathematics and/or science[1] | 8 | 11 | 10 |

Reference: Detailed table 7

Note: Averages are based on responses of all institutions in each category, including those with no minimum requirements in the field. If the averages were based only on institutions *with* minimum requirements, these averages would be higher. In particular, these averages understate the minimum hours required in fields where only a small percentage of institutions have minimum requirements.

Further perspective on these course requirements can be gained by examining differences in the minimum number of credit hours required in each of these subject areas (see table B). For English composition, the minimum was an average of 6 credit hours at doctoral institutions, and 5 credit hours each at comprehensive institutions and baccalaureate colleges. The least number of hours required was in the classics.

The minimum average number of credit hours for non-humanities subjects ranged from 4 hours of mathematics in baccalaureate colleges to 9 hours of natural and physical sciences in doctorate institutions (see table C).

Data were analyzed on institutions reporting increases between 1979–80 and 1984–85 in the minimum credit hours required in selected fields. Several fields showed significant activity, especially mathematics and world civilization (see table D). Most institutions reported no change.

Respondents were also asked if all students, in order to graduate, were required to take one or more courses that included substantial content in five specific subjects. These included: ancient or medieval European history; European history since the Renaissance; American history and literature; literature and philosophy of ancient Greece and Rome; and literature, history, or cultures of Africa or Asia.

As can be seen (table E), relatively few institutions reported such specific requirements. Once again, baccalaureate institutions formed the main exceptions to this pattern. Among baccalaureate colleges, 31 percent required courses in European history since the

**TABLE D—Institutions Reporting Increases Between 1979–80 and 1984–85 in the Minimum Credit Hours Required in Selected Fields**

(Percentage of Institutions)

| | Doctorate Institutions (N = 163) | Comprehensive Institutions (N = 399) | Baccalaureate Institutions (N = 708 |
|---|---|---|---|
| Mathematics | 19 | 15 | 17 |
| World civilization | 3 | 11 | 21 |
| Social Sciences | 12 | 10 | 14 |
| English/American literature | 4 | 5 | 16 |
| Natural and physical sciences | 10 | 8 | 10 |
| English composition | 10 | 11 | 5 |
| Philosophy | 3 | 4 | 10 |

Reference: Detailed table 6

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[1] Some institutions collapsed categories, reporting the number of credit hours for both mathematics and/or natural and physical sciences.

**TABLE E—Percentage of Four-year Institutions with Course Requirements Covering Specific Content Areas**

| | Doctorate Institutions (N=163) | Comprehensive Institutions (N=399) | Baccalaureate Institutions (N=708) |
|---|---|---|---|
| American history and literature | 19 | 35 | 26 |
| European history since the Renaissance | 11 | 19 | 31 |
| Ancient or medieval European history | 9 | 17 | 26 |
| Literature and philosophy of ancient Greece and Rome | 8 | 7 | 19 |
| Literature, history, or cultures of Africa or Asia | 14 | 7 | 8 |

Reference: Detailed table 9

Renaissance and almost as many required courses covering American history and literature, and ancient or medieval European history. Fully 35 percent of comprehensive institutions required coursework in American history and literature. In contrast, fewer than 1 in 10 institutions required all of their students to take courses dealing with the literature, history, or cultures of non-Western countries. Doctorate institutions required such courses slightly more frequently than did others.

The general pattern among American colleges and universities today, appears to be that few specific subjects are mandated for all students. This is especially evident at doctoral institutions, where individual departments or colleges typically set their own requirements for their students. Some ambiguity in questionnaire wording must also be acknowledged, however. Thus, for example, respondents might have answered the query about American history and American literature only in terms of a course that covered both aspects (see Appendix A). It is far more typical for colleges to offer history courses apart from literature coursework.

**Foreign Language Requirements.** About half the baccalaureate colleges and about 4 in 10 of comprehensive and doctoral institutions had foreign language requirements for all their undergraduate students (see table F). Among such institutions, 54 percent of the doctoral universities, 46 percent of the comprehensive institutions, and 41 percent of the baccalaureate colleges required that a specified number of foreign language courses or hours be taken. Very few institutions required that a language proficiency examination must be passed, and a number of institutions allowed substitutions to foreign language requirements. Such practice was most frequent in baccalaureate colleges where 58 percent allowed students to take computer courses instead of foreign languages.

A significantly greater proportion of private institutions had foreign language requirements, compared to public institutions. Over half the private doctoral universities and private baccalaureate colleges and 62 percent of private comprehensive universities required foreign language study of all degree candidates. In contrast, about 3 in 10 public institutions did so (see detailed table 10).

**Other Requirements.** Over half the baccalaureate colleges but only 3 in 10 comprehensive and 2 in 10 doctorate universities required *all* undergraduates to have formal training in the use of the college library for research. This typically involved an orientation conducted by library staff, rather than more intensive training conducted by faculty (see table G). Other forms of library training were cited by 20 percent of doctoral institutions and by 13 percent of other four-year institutions. These included self-tutorial programs undertaken through workbooks as well as specific courses on library research skills and work on

**TABLE F—Percentage of Four-year Institutions with Foreign Language Requirements for All Undergraduates, 1984–85**

| | Doctorate Institutions (N=163) | Comprehensive Institutions (N=399) | Baccalaureate Institutions (N=708) |
|---|---|---|---|
| Percentage requiring foreign language coursework | 39% | 41% | 48% |
| Number of four-year institutions requiring foreign languages | (N=63) | (N=162) | (N=341) |
| Specified courses | 54% | 46% | 41% |
| Proficiency examinations | 19 | 16 | 6 |
| Substitutions, computer courses | 16 | 27 | 58 |
| Substitutions, other | 35 | 25 | 22 |

Note: Multiple responses were permitted; therefore, detail will total to more than 100 percent. These figures were recalculated from data in detailed table 10.

**TABLE G—Percentage of Four-year Institutions Requiring Library Training, 1984–85**

| | Doctorate Institutions (N = 163) | Comprehensive Institutions (N = 399) | Baccalaureate Institutions (N = 708) |
|---|---|---|---|
| Percentage requiring formal library training | 22% | 32% | 56% |
| Number of institutions requiring formal library training | (N = 35) | (N = 128) | (N = 384) |
| Orientation by library staff | 74% | 81% | 96% |
| Intensive training | 14 | 45 | 46 |
| Other | 20 | 13 | 13 |

Reference: Detailed table 12

Note: Multiple responses were permitted; therefore, detail will total to more than 100 percent. These figures were recalculated from data in detailed table 12.

library skills that was included as part of an English composition course or a literature course.

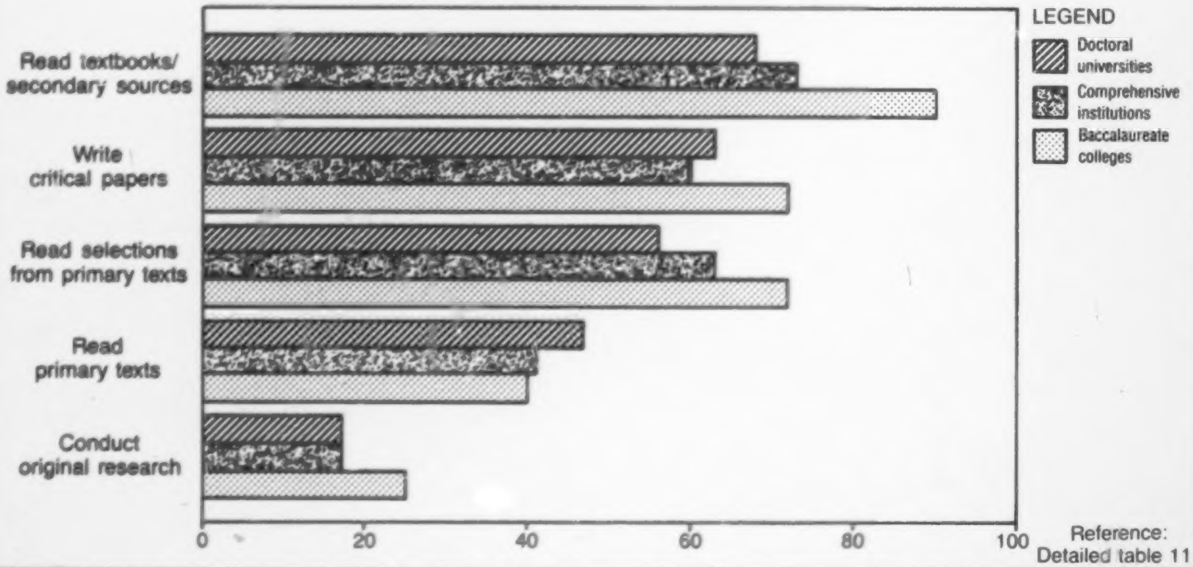
**Instructional Approaches.** Respondents were asked about the instructional approaches they employed in general education courses in the humanities. These methods included the use of primary literary, historical, or critical texts (in their entirety or as selections); the use of textbooks and other secondary sources; the writing of critical papers; and conduct of original research from primary sources.

Reading textbooks and other secondary sources was the most prevalent method of teaching humanities in four-year institutions: 90 percent of baccalaureate colleges, 73 percent of comprehensive universities, and 68 percent of doctoral institutions employed this method in at least one-third of the humanities courses their students take to fulfill general education requirements (see figure 4 and detailed table 11). Other popular methods included reading selections from primary literary, historical, or critical texts and writing critical papers. Only about 4 in 10 institutions required that students in humanities courses read summary texts in their entirety, and fewer than 2 in 10 required their students to conduct original research from primary sources.

Public and private institutions differed somewhat in the instructional approaches employed to teaching of humanities courses. Private institutions were more likely than were public institutions to require students to read primary texts in their entirety or use selections from such sources, to write critical papers, and to conduct original research from primary

**FIGURE 4**

Percentage of Institutions Using Various Teaching Methods in At Least One-third of General Education Courses in the Humanities



Reference: Detailed table 11

**TABLE H—Approaches to Teaching Expository Writing, 1984–85**
(Percentage of Institutions)

| Type of Approach | Doctorate Institutions (N = 163) | Comprehensive Institutions (N = 399) | Baccalaureate Institutions (N = 708) |
|---|---|---|---|
| Writing is taught only in the English department | 42 | 46 | 47 |
| Writing is taught in a special composition program | 68 | 72 | 57 |
| Writing is taught in a writing laboratory | 61 | 66 | 49 |
| Writing is taught using a peer tutorial system | 22 | 41 | 31 |
| Writing is taught in a "writing across-the-curriculum" program, i.e., in all or most academic departments | 36 | 43 | 43 |
| Students are responsible for a designated amount of critical writing in the general education courses | 47 | 35 | 44 |
| Students must pass a writing proficiency examination | 28 | 34 | 25 |
| Students *may* write a senior thesis | 68 | 48 | 52 |
| Students *must* write a senior thesis | 3 | 1 | 10 |

Reference: Detailed table 13

sources. Public institutions were more likely than were private ones to rely on textbooks and other secondary sources.

Baccalaureate colleges were somewhat different in this aspect. First, they relied more frequently than did other institutions on the use of textbooks and secondary sources, on selections from primary texts, on writing critical papers, and on conducting original research—even though this was required by only one-fourth of baccalaureate colleges. Only 4 in 10 baccalaureate colleges required that their students read primary texts, and this practice was more prevalent among public than among private baccalaureate colleges. This contrasts with the practice at other types of institutions where the private more frequently than the public required students to read primary texts.

Respondents were given nine different modes by which to characterize their institution's approach to expository writing (see table H). More than one approach could be indicated. The most prevalent approach, cited by almost two-thirds of all four-year institutions, was the use of a special composition program for undergraduates. Writing is taught in writing laboratories at over half of the institutions. About 4 in 10 institutions required "writing across the curriculum" and a similar proportion included critical writing in their general education courses. A senior thesis was rarely required, and relatively few institutions required a writing proficiency examination.

Approaches to teaching expository writing skills differed somewhat by type of four-year institutions. For instance, the use of special composition programs and writing laboratories was more prevalent in doctorate and comprehensive universities than in baccalaureate colleges (see detailed table 13). There were also some differences by control of institutions. In general, public four-year institutions were more likely than were private ones to rely on writing laboratories, while private institutions were more likely to teach writing skills in all or most academic departments (i.e., "writing across the curriculum").

**Restructuring of General Education Requirements.** At the time of the survey, between 50 and 60 percent of the four-year institutions were either en-

**TABLE I—Percentage of Four-year Institutions Reporting Restructuring of General Education Requirements and Principal Initiators**

| | Doctorate Institutions (N = 163) | Comprehensive Institutions (N = 399) | Baccalaureate Institutions (N = 708) |
|---|---|---|---|
| Percentage of institutions reporting restructuring of requirements | 57% | 57% | 51% |
| Number of institutions reporting such restructuring | (N = 102) | (N = 219) | (N = 361) |
| Percentage of these institutions reporting restructing initiated by | | | |
| Faculty committee/senate | 35% | 56% | 39% |
| Dean/president | 35 | 38 | 51 |
| Other | 30 | 7 | 10 |

Reference: Detailed table 14.1

gaged in some stage of restructuring or had just completed restructuring their general education requirements. Of these, about half were in the planning stages regarding such changes; relatively few had completed the process (see table I and detailed table 14).

Slightly more doctoral universities were engaged in such a restructuring process than comprehensive institutions or baccalaureate colleges. Further, public institutions were more likely than were private institutions to report that they were either considering such change or had already restructured their general education requirements.

Between one-third and one-half of institutions cited faculty groups (faculty committees or the faculty senate) as the principal "initiators" in the restructuring of general education requirements. Senior administrators (typically a dean or, less often, a president) were often cited as the initiator of this change, particularly in baccalaureate colleges. Other factors cited as principal initiators were state agency directives or state legislature guidelines, particularly at doctoral universities (see table I).

## General Education Requirements at Two-year Colleges[4]

Most two-year colleges (89 percent) had general education requirements for all of their degree candidates. Typically, this involved an average of 26 credit hours of coursework out of an average of 65 hours required for completion of a two-year degree (see table J and detailed table 4.1). There was no appreciable change over the last five years in the proportion of total hours that were devoted to general education.

As was the case with four-year institutions, the great majority of two-year colleges (81 percent) required their students to choose from a limited range of courses in meeting general education requirements. Eighty-nine percent of two-year colleges reported that all degree candidates must take humanities courses that were specified along departmental lines (e.g., history 101). As with four-year institutions, two-year colleges showed some movement away from allowing students an unlimited range of choices (see detailed table 2).

With respect to specific subject areas, two-year colleges also reflected the general tendency, noted earlier with four-year institutions, to require English composition courses. In 1984–85, 90 percent of two-year colleges did so. In contrast, relatively few two-year colleges specified that students must take coursework in English or American literature (23 percent), world civilization (13 percent), or other humanities subjects. Over 7 in 10 two year colleges also required studies in social sciences, while 6 in 10 required studies in mathematics and natural and physical sciences (see table K and detailed table 8).

Notably, a number of two-year colleges increased their humanities requirements during the last five years. As figure 5 shows, 12 percent of two-year colleges reported increases in English and 17 percent reported increases in other humanities subjects (which may have included linguistics, art history,

**TABLE J—Hours Required for General Education Courses and for Graduation: Two-year Programs**

| Type of Institution and Requirement | 1984–85 (In Credit Hours) | 1979–80 |
|---|---|---|
| All institutions with two-year programs | | |
| Average hours of general education | 29 | 28 |
| Average hours for graduation | 64 | 64 |
| Two-year colleges | | |
| Average hours of general education | 26 | 26 |
| Average hours for graduation | 65 | 66 |

Reference: Detailed table 4.1

**TABLE K—Selected Characteristics of General Education Requirements at Two-year Colleges**

| Characteristics | Percentage of Two-year Colleges |
|---|---|
| Institutions with general education requirements | 89 |
| Approaches to teaching expository writing (fall 1984) | |
| English department only | 57 |
| Composition program | 50 |
| Writing laboratory | 48 |
| Peer tutorial | 21 |
| Across-the-curriculum | 34 |
| Designated amount of critical writing | 44 |
| Proficiency examination | 25 |

| Required coursework in selected fields, 1984–85 | 1984–85 (In Percentages) | 1979–80 |
|---|---|---|
| English composition | 90 | 84 |
| English/American literature | 23 | 20 |
| Foreign language | 5 | 5 |
| World civilization | 13 | 12 |
| Other history | 22 | 19 |
| Social sciences | 73 | 66 |
| Mathematics | 57 | 43 |
| Natural and physical sciences | 62 | 53 |

Reference: Detailed tables 1, 13, 8 and 8.1

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[4] The reader should note that the detailed tables include information on two-year degree programs offered by **four-year** institutions. This section of the report focuses only on general education requirements offered at two-year colleges.

music history, archaeology, jurisprudence, religious studies and ethics, or interdisciplinary courses in the humanities). In nonhumanities fields, between 15 and 22 percent of the two-year colleges showed increases in minimum credit hours.

Only 11 percent of two-year colleges had some kind of foreign language requirements for all degree candidates (compared with two-fifths of four-year institutions). The average minimum credit hours in foreign language were also lower at two-year colleges than at four-year institutions (see detailed tables 7 and 10).

The survey also sought information on the extent to which institutions required coursework in specific subject areas of the humanities (e.g., American history and literature, the literature and philosophy of ancient Greece and Rome). It is interesting to note that about 4 in 10 two-year colleges reported that they required all degree candidates to take coursework in American history and literature (see detailed table 9). This is much higher than the proportion of doctoral universities (19 percent) or baccalaureate colleges (26 percent) with such a requirement. In other areas, very few two-year colleges reported any requirements.

In terms of instructional methods used in required humanities courses, 79 percent of two-year colleges relied significantly on secondary sources, 54 percent required students to write critical papers and 37 percent used selections from primary texts for one-third or more of these courses. Only 20 percent reported that students in these courses used primary texts (see detailed table 11).

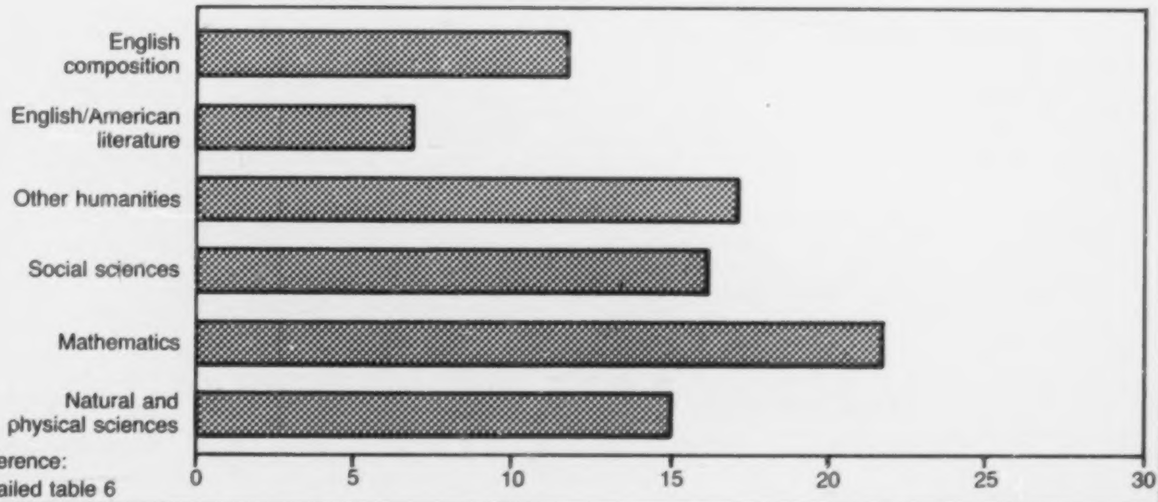
Thirty-six percent of two-year colleges required formal library training for all degree candidates. Of these colleges, one-third offered such training through an orientation by library staff, while a few required more intensive training (see detailed table 12).

As was the case with four-year institutions, the predominant method for teaching expository writing at two-year colleges was through the English department; 57 percent followed this approach. Fifty percent of two-year colleges offered a special composition program to teach expository writing, 48 percent used a writing laboratory to teach expository writing skills, 44 percent required a designated amount of critical writing in the general education courses, and 34 percent relied on the "writing across the curriculum" method. Only 25 percent required a proficiency examination (see table K).

About half of the two-year colleges were involved in restructuring their general education requirements during 1984-85; 22 percent reported being involved in the planning stages of such changes. Both of these figures suggest a lower level of activity in this area than was reported by four-year institutions. Faculty committees and deans shared the role as principal initiators of such restructuring at two-year colleges.

**FIGURE 5**

Percentage of Two-year Colleges Reporting Increases in the Minimum Credit Hours in Selected Fields Between 1979–80 and 1984–85



Reference: Detailed table 6

# SUMMARY

This report has offered a detailed look at general education requirements in American colleges and universities, with a particular focus on the role of humanities subject-matter in such requirements. The general view that emerges does much to support the concern voiced recently by a number of national reports regarding the low degree of coherence in the undergraduate curriculum: apart from a general consensus on a requirement for coursework in English composition, colleges ranged widely on what they designated as needed in general education.

Baccalaureate colleges offer some exception to this overall pattern. Many of these colleges do require all their students to cover specific academic areas as part of their undergraduate education. Probably, too, a comparable survey of requirements for liberal-arts majors would show a greater degree of consensus that certain subject areas should be part of an undergraduate's course of study. Nevertheless, this study—which focused on requirements applicable to all degree candidates, regardless of major--indicates that very little common learning is now signified by the granting of baccalaureate degrees in America's colleges and universities.

# DETAILED TABLES

**TABLE 1—Institution-wide General Education Requirements of All Degree Candidates, 1984–85**

| | All Institutions | | | Doctorate | | | Comprehensive | | | Baccalaureate | | | Two-year | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total | Public | Private | Total | Public | Private | Total | Public | Private | Total | Public | Private | Total | Public | Private |
| Total | 2,546 | 1,395 | 1,151 | 163 | 104 | 59 | 399 | 252 | 147 | 708 | 119 | 589 | 1,276 | 920 | 356 |
| Institutions requiring general education | 2,373 | 1,259 | 1,114 | 156 | 97 | 59 | 366 | 242 | 124 | 694 | 119 | 575 | 1,157 | 801 | 356 |
| Percent | 93.2 | 90.2 | 96.8 | 95.6 | 93.2 | 100.0 | 91.7 | 96.2 | 84.1 | 98.0 | 100.0 | 97.7 | 89.3 | 87.1 | 100.0 |
| Institutions requiring no general education | 173 | 136 | 37 | 7 | 7 | 0 | 33 | 10 | 23 | 14 | 0 | 14 | 119 | 119 | 0 |
| Percent | 6.8 | 9.8 | 3.2 | 4.4 | 6.8 | 0.0 | 8.3 | 3.8 | 15.9 | 2.0 | 0.0 | 2.3 | 9.2 | 12.9 | 0.0 |

**TABLE 2—Type of General Education Requirements**

(Percentage of Institutions)

| | Doctorate | | | Comprehensive | | | Baccalaureate | | | Two-year | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total (N = 163) | Public (N = 104) | Private (N = 59) | Total (N = 399) | Public (N = 252) | Private (N = 147) | Total (N = 708) | Public (N = 119) | Private (N = 589) | Total (N = 1.296) | Public (N = 940) | Private (N = 356) |
| 1984–85 | | | | | | | | | | | | |
| Specified departmental | 63 | 69 | 52 | 79 | 80 | 78 | 83 | 100 | 80 | 89 | 85 | 10[illegible] |
| Specified interdisciplinary | 15 | 14 | 16 | 34 | 36 | 31 | 31 | 14 | 34 | 39 | 32 | 58 |
| Limited area | 85 | 88 | 80 | 87 | 87 | 88 | 87 | 93 | 86 | 81 | 89 | 60 |
| Unlimited area | 22 | 17 | 32 | 15 | 13 | 19 | 13 | 7 | 14 | 7 | 8 | 5 |
| 1979–80 | | | | | | | | | | | | |
| Specified departmental | 58 | 64 | 48 | 78 | 75 | 83 | 79 | 79 | 79 | 83 | 78 | 97 |
| Specified interdisciplinary | 9 | 10 | 8 | 28 | 27 | 29 | 27 | 7 | 31 | 30 | 24 | 45 |
| Limited area | 63 | 60 | 68 | 76 | 74 | 80 | 70 | 64 | 71 | 71 | 76 | 55 |
| Unlimited area | 37 | 33 | 44 | 19 | 18 | 20 | 22 | 14 | 24 | 14 | 18 | 5 |

**TABLE 3—General Education Requirements, by Division**

(Percentage of Institutions)

| | Doctorate | | Comprehensive | | Baccalaureate | | Two-year | |
|---|---|---|---|---|---|---|---|---|
| Division | 1984–85 | 1979–80 | 1984–85 | 1979–80 | 1984–85 | 1979–80 | 1984–85 | 1979–80 |
| | (N = 163) | | (N = 399) | | (N = 708) | | (N = 1,296) | |
| Lower only | 30 | 25 | 29 | 32 | 21 | 23 | 90 | 90 |
| Upper only | 0 | 2 | 5 | 5 | 1 | 1 | 0 | 0 |
| Upper and/or lower | 70 | 73 | 66 | 63 | 78 | 76 | 10 | 10 |

### TABLE 4—Average Hours of General Education and Average Hours for Graduation, Four-year Programs, 1984–85 and 1979–80

| | All Institutions | | | Doctorate | | | Comprehensive | | | Baccalaureate | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total | Public | Private | Total | Public | private | Total | Public | Private | Total | Public | Private |
| Average hours of general education, 1984–85 | 45 | 42 | 46 | 39 | 40 | 39 | 43 | 42 | 44 | 47 | 44 | 48 |
| Average hours of general education, 1979–80 | 42 | 40 | 44 | 38 | 39 | 38 | 41 | 40 | 42 | 44 | 39 | 46 |
| Average hours for graduation, 1984–85 | 125 | 124 | 126 | 123 | 123 | 122 | 123 | 124 | 123 | 127 | 125 | 128 |
| Average hours for graduation, 1979–80 | 125 | 125 | 125 | 126 | 128 | 124 | 123 | 125 | 122 | 126 | 125 | 127 |

### TABLE 4.1—Average Hours of General Education and Average Hours for Graduation, Two-year Programs, 1984–85 and 1979–80

| | All Institutions | | | Doctorate | | | Comprehensive | | | Baccalaureate | | | Two-year | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total | Public | Private | Total | Public | Private | Total | Public | Private | Total | Public | Private | Total | Public | Private |
| Average hours of general education, 1984–85 | 29 | 26 | 30 | 34 | 25 | 36 | 30 | 26 | 31 | 26 | 23 | 27 | 26 | 26 | 25 |
| Average hours of general education, 1979–80 | 28 | 24 | 30 | 34 | 26 | 36 | 29 | 22 | 31 | 24 | 23 | 25 | 26 | 25 | 27 |
| Average hours for graduation, 1984–85 | 64 | 62 | 65 | 60 | 60 | 60 | 65 | 63 | 66 | 63 | 64 | 63 | 65 | 62 | 70 |
| Average hours for graduation, 1979–80 | 64 | 61 | 65 | 60 | 63 | 60 | 64 | 57 | 66 | 63 | 64 | 63 | 66 | 62 | 69 |

### TABLE 5—Distribution of Institutions by Percentage of Total Hours Required That Are in General Education, Four-year Programs

(Percentage of Institutions)

| General Education Hours as a Percentage of Total Hours | Total Four-year Institutions | | Doctorate | | Comprehensive | | Baccalaureate | |
|---|---|---|---|---|---|---|---|---|
| | 1984–85 | 1979–80 | 1984–85 | 1979–80 | 1984–85 | 1979–80 | 1984–85 | 1979–80 |
| | (N = 1,270) | | (N = 163) | | (N = 399) | | (N = 708) | |
| 0–4 percent | 5 | 6 | 4 | 4 | 9 | 12 | 3 | 3 |
| 5–24 percent | 7 | 12 | 19 | 26 | 10 | 9 | 3 | 10 |
| 25–34 percent | 29 | 29 | 42 | 38 | 32 | 40 | 24 | 20 |
| 35–44 percent | 44 | 40 | 19 | 22 | 36 | 26 | 54 | 52 |
| 45 plus percent | 15 | 13 | 16 | 10 | 13 | 12 | 16 | 14 |
| Total | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

Note: Percentage distributions may not sum to 100 because of rounding.

### TABLE 5.1—Distribution of Institutions by the Percentage of Total Hours Required That Are in General Education, Two-year Programs

(Percentage of Institutions)

| | Total Four-year Institutions | | Doctorate | | Comprehensive | | Baccalaureate | | Two-year | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1984–85 (N = 350) | 1979–80 (N = 346) | 1984–85 (N = 21) | 1979–80 (N = 21) | 1984–85 (N = 77) | 1979–80 (N = 73) | 1984–85 (N = 252) | 1979–80 (N = 252) | 1984–85 (N = 1,296) | 1979–80 |
| 0–4 percent | 1 | 6 | 11 | 11 | 0 | 9 | 0 | 4 | 0 | 2 |
| 5–24 percent | 12 | 14 | 11 | 11 | 30 | 26 | 7 | 12 | 11 | 15 |
| 25–34 percent | 22 | 18 | 0 | 0 | 17 | 14 | 26 | 21 | 28 | 26 |
| 35–44 percent | 26 | 30 | 11 | 11 | 6 | 6 | 34 | 38 | 19 | 19 |
| 45 plus percent | 38 | 31 | 67 | 67 | 46 | 42 | 34 | 25 | 42 | 38 |
| Total | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

Note: Percentage distributions may not sum to 100 because of rounding.

### TABLE 6—Changes Between 1979–80 and 1984–85 in Minimum Credit Hours Required in Selected Fields

(In Percentage)

| | Doctorate | | | Comprehensive | | | Baccalaureate | | | Two-year | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Increase | No Change (N = 163) | Decrease | Increase | No Change (N = 399) | Decrease | Increase | No Change (N = 708) | Decrease | Increase | No Change (N = 1,296) | Decrease |
| English composition | 10 | 87 | 3 | 11 | 86 | 3 | 5 | 95 | 0 | 12 | 86 | 2 |
| English/American literature | 4 | 93 | 3 | 5 | 91 | 4 | 16 | 79 | 5 | 7 | 87 | 7 |
| Foreign language | 7 | 90 | 3 | 4 | 96 | 0 | 15 | 79 | 6 | 0 | 100 | 0 |
| World civilization | 3 | 97 | 0 | 11 | 87 | 1 | 21 | 77 | 2 | 1 | 98 | 1 |
| Other history | 7 | 91 | 2 | 4 | 92 | 4 | 8 | 87 | 5 | 3 | 97 | 0 |
| Philosophy | 3 | 97 | 0 | 4 | 95 | 1 | 10 | 87 | 3 | 3 | 96 | 1 |
| Classics | 0 | 100 | 0 | 0 | 100 | 0 | 2 | 98 | 0 | 0 | 100 | 0 |
| Other humanities | 10 | 86 | 4 | 15 | 82 | 3 | 14 | 78 | 9 | 17 | 83 | 0 |
| Arts | 2 | 98 | 0 | 3 | 96 | 1 | 10 | 90 | 0 | 1 | 99 | 0 |
| Social sciences | 12 | 75 | 13 | 10 | 84 | 7 | 14 | 77 | 9 | 16 | 80 | 4 |
| Mathematics | 19 | 78 | 3 | 15 | 83 | 1 | 17 | 82 | 1 | 22 | 73 | 5 |
| Natural & physical sciences | 10 | 81 | 9 | 8 | 88 | 5 | 10 | 77 | 13 | 15 | 78 | 7 |
| Mathematics and/or science | 6 | 91 | 3 | 4 | 95 | 1 | 2 | 96 | 2 | 3 | 96 | 0 |
| Combination of humanities | 6 | 90 | 4 | 2 | 96 | 1 | 7 | 91 | 2 | 2 | 98 | 0 |
| Humanities and/or choice of other subject areas | 4 | 94 | 2 | 0 | 98 | 2 | 3 | 96 | 1 | 0 | 100 | 0 |
| Other | 0 | 98 | 2 | 0 | 100 | 0 | 0 | 100 | 0 | 0 | 100 | 0 |

## TABLE 7—Average Minimum Credit Hours Required at Institutions with School-wide General Education Requirements, by Field, 1984–85

| | Doctorate | | | Comprehensive | | | Baccalaureate | | | Two-year | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total (N = 156) | Public (N = 97) | Private (N = 59) | Total (N = 366) | Public (N = 242) | Private (N = 124) | Total (N = 694) | Public (N = 119) | Private (N = 575) | Total (N = 1,157) | Public (N = 801) | Private (N = 356) |
| English composition | 6 | 6 | 6 | 5 | 6 | 5 | 5 | 6 | 5 | 7 | 6 | 8 |
| English/American literature | 5 | 5 | 5 | 5 | 4 | 5 | 4 | 4 | 4 | 4 | 4 | 3 |
| Foreign language | 9 | 10 | 8 | 7 | 6 | 9 | 7 | 5 | 8 | 2 | 2 | 1 |
| World civilization | 6 | 6 | 7 | 6 | 5 | 8 | 4 | 4 | 4 | 4 | 6 | 1 |
| Other history | 4 | 6 | 3 | 5 | 5 | 5 | 4 | 4 | 4 | 3 | 5 | 1 |
| Philosophy | 4 | 4 | 5 | 5 | 3 | 9 | 4 | 3 | 4 | 3 | 2 | 6 |
| Classics | 0 | 0 | 0 | 1 | 2 | 0 | 3 | 3 | 3 | 0 | 0 | 0 |
| Other humanities | 8 | 7 | 8 | 7 | 7 | 8 | 9 | 6 | 10 | 6 | 5 | 7 |
| Arts | 3 | 3 | 4 | 3 | 4 | 2 | 4 | 5 | 4 | 2 | 3 | 1 |
| Social sciences | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 10 | 7 | 5 | 6 | 4 |
| Mathematics | 5 | 5 | 5 | 4 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 6 |
| Natural and physical sciences | 9 | 9 | 8 | 7 | 9 | 6 | 7 | 8 | 7 | 6 | 7 | 5 |
| Mathematics and/or science | 8 | 8 | 8 | 11 | 11 | 10 | 10 | 12 | 9 | 5 | 6 | 1 |
| Combination of humanities | 10 | 10 | 10 | 11 | 12 | 11 | 13 | 14 | 12 | 7 | 10 | 1 |
| Humanities and/or choice of other subject areas | 19 | 20 | 18 | 16 | 13 | 22 | 10 | 18 | 8 | 6 | 6 | 5 |
| Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 0 |

Note: Averages are based on responses of all institutions in each category, including those with no minimum requirements in a field.

## TABLE 8—Institutions with General Education Requirements in Selected Fields, 1984–85

(Percentage of Institutions)

| | Doctorate | | | Comprehensive | | | Baccalaureate | | | Two-year | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total (N = 156) | Public (N = 97) | Private (N = 59) | Total (N = 366) | Public (N = 242) | Private (N = 124) | Total (N = 694) | Public (N = 119) | Private (N = 575) | Total (N = 1,157) | Public (N = 801) | Private (N = 356) |
| English composition | 90 | 93 | 84 | 84 | 89 | 71 | 88 | 100 | 85 | 90 | 88 | 100 |
| English/American literature | 28 | 30 | 24 | 35 | 31 | 45 | 54 | 57 | 54 | 23 | 25 | 50 |
| Foreign language | 26 | 18 | 40 | 22 | 20 | 26 | 36 | 14 | 42 | 5 | 6 | 11 |
| World Civilization | 17 | 11 | 28 | 34 | 32 | 39 | 52 | 50 | 52 | 13 | 15 | 17 |
| Other history | 19 | 20 | 16 | 26 | 28 | 19 | 27 | 43 | 23 | 22 | 26 | 28 |
| Philosophy | 19 | 11 | 32 | 26 | 21 | 39 | 46 | 14 | 54 | 7 | 7 | 11 |
| Classics | 0 | 0 | 0 | 1 | 1 | 0 | 4 | 14 | 2 | 0 | 0 | 0 |
| Other humanities | 41 | 39 | 44 | 57 | 57 | 55 | 68 | 57 | 71 | 39 | 42 | 44 |
| Arts | 4 | 2 | 8 | 18 | 17 | 19 | 29 | 21 | 31 | 5 | 6 | 6 |
| Social sciences | 72 | 68 | 80 | 75 | 79 | 71 | 86 | 79 | 88 | 73 | 82 | 67 |
| Mathematics | 51 | 59 | 36 | 59 | 61 | 55 | 50 | 71 | 44 | 57 | 63 | 61 |
| Natural and physical sciences | 62 | 64 | 60 | 67 | 73 | 52 | 71 | 71 | 71 | 62 | 69 | 61 |
| Mathematics and/or science | 22 | 18 | 28 | 14 | 12 | 19 | 20 | 14 | 21 | 11 | 12 | 11 |
| Humanities combination | 26 | 27 | 24 | 13 | 15 | 10 | 20 | 14 | 21 | 15 | 18 | 22 |
| Humanities and/or choice of other subject areas | 12 | 14 | 8 | 4 | 4 | 3 | 6 | 7 | 6 | 4 | 4 | 6 |

## TABLE 8.1—Institutions with General Education Requirements in Selected Fields, 1979–80

(Percentage of Institutions)

| | Doctorate | | | Comprehensive | | | Baccalaureate | | | Two-year | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total (N = 156) | Public (N = 97) | Private (N = 59) | Total (N = 366) | Public (N = 242) | Private (N = 124) | Total (N = 694) | Public (N = 119) | Private (N = 575) | Total (N = 1,157) | Public (N = 801) | Private (N = 356) |
| English composition | 86 | 86 | 84 | 77 | 84 | 61 | 85 | 93 | 83 | 84 | 83 | 89 |
| English/American literature | 23 | 27 | 16 | 30 | 27 | 39 | 42 | 43 | 42 | 20 | 15 | 50 |
| Foreign language | 19 | 16 | 24 | 17 | 16 | 19 | 26 | 7 | 31 | 5 | 4 | 11 |
| World civilization | 14 | 11 | 20 | 24 | 23 | 29 | 33 | 29 | 35 | 12 | 12 | 11 |
| Other history | 13 | 16 | 8 | 24 | 28 | 16 | 23 | 36 | 19 | 19 | 20 | 17 |
| Philosophy | 16 | 11 | 24 | 21 | 17 | 29 | 36 | 0 | 46 | 3 | 2 | 11 |
| Classics | 0 | 0 | 0 | 1 | 1 | 0 | 2 | 0 | 2 | 0 | 0 | 0 |
| Other humanities | 36 | 36 | 36 | 47 | 48 | 45 | 62 | 57 | 64 | 33 | 33 | 33 |
| Arts | 3 | 0 | 8 | 15 | 15 | 16 | 20 | 14 | 21 | 5 | 4 | 6 |
| Social sciences | 70 | 68 | 72 | 74 | 76 | 71 | 79 | 71 | 81 | 66 | 68 | 56 |
| Mathematics | 36 | 41 | 28 | 45 | 48 | 39 | 33 | 50 | 29 | 43 | 42 | 44 |
| Natural and physical sciences | 55 | 59 | 48 | 64 | 69 | 52 | 64 | 57 | 65 | 53 | 54 | 50 |
| Mathematics and/or science | 19 | 14 | 28 | 12 | 11 | 16 | 20 | 14 | 21 | 10 | 10 | 11 |
| Humanities combination | 26 | 25 | 28 | 13 | 15 | 10 | 18 | 7 | 21 | 13 | 12 | 17 |
| Humanities and/or choice of other areas | 9 | 9 | 8 | 4 | 4 | 3 | 4 | 7 | 4 | 4 | 4 | 6 |

## TABLE 9—Institutions that Require Students to Take One or More Courses Covering Various Humanities Areas, 1984–85

(Percentage of Institutions)

| | Doctorate | | | Comprehensive | | | Baccalaureate | | | Two-year | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Content | Total (N = 163) | Public (N = 104) | Private (N = 59) | Total (N = 399) | Public (N = 252) | Private (N = 147) | Total (N = 708) | Public (N = 119) | Private (N = 589) | Total (N = 1,296) | Public (N = 940) | Private (N = 356) |
| Ancient or medieval European history | 9 | 10 | 8 | 17 | 12 | 30 | 26 | 21 | 27 | 4 | 4 | 5 |
| European history from the Renaissance | 11 | 10 | 12 | 19 | 11 | 31 | 31 | 21 | 33 | 6 | 5 | 8 |
| American history and literature | 19 | 27 | 4 | 35 | 42 | 22 | 26 | 29 | 26 | 39 | 28 | 42 |
| Literature and philosophy of ancient Greece and Rome | 8 | 10 | 4 | 7 | 8 | 7 | 19 | 0 | 22 | 7 | 4 | 16 |
| Literature, history, or cultures of Africa or Asia | 14 | 15 | 12 | 7 | 5 | 10 | 8 | 0 | 10 | 2 | 2 | 0 |

## TABLE 10—Institutions with Foreign Language Study Graduation Requirements for All Degree Candidates, 1984–85

(Percentage of Institutions)

| Requirement | Doctorate |  |  | Comprehensive |  |  | Baccalaureate |  |  | Two-year |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  | Total (N = 163) | Public (N = 104) | Private (N = 59) | Total (N = 399) | Public (N = 252) | Private (N = 147) | Total (N = 708) | Public (N = 119) | Private (N = 589) | Total (N = 1,296) | Public (N = 940) | Private (N = 356) |
| Foreign language study is required | 39 | 31 | 52 | 41 | 28 | 62 | 48 | 29 | 52 | 11 | 13 | 5 |
| Specified courses | 21 | 21 | 20 | 19 | 17 | 21 | 20 | 14 | 21 | 3 | 3 | 3 |
| Proficiency examination | 7 | 5 | 12 | 6 | 3 | 12 | 3 | 0 | 4 | 0 | 0 | 0 |
| Computer substitute | 3 | 5 | 0 | 2 | 0 | 7 | 9 | 7 | 10 | 0 | 0 | 0 |
| Other substitutions | 3 | 2 | 4 | 8 | 6 | 12 | 18 | 0 | 22 | 3 | 4 | 0 |
| Specific courses and/or proficiency examination | 13 | 10 | 20 | 10 | 9 | 12 | 10 | 7 | 11 | 0 | 0 | 0 |

## TABLE 11—Institutions Using Various Instructional Methods in One-third or More of Required Humanities Courses, 1984–85

(Percentage of Institutions)

| Method | Doctorate |  |  | Comprehensive |  |  | Baccalaureate |  |  | Two-year |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  | Total (N = 163) | Public (N = 104) | Private (N = 59) | Total (N = 399) | Public (N = 252) | Private (N = 147) | Total (N = 708) | Public (N = 119) | Private (N = 589) | Total (N = 1,296) | Public (N = 940) | Private (N = 356) |
| Primary texts | 47 | 38 | 64 | 41 | 38 | 50 | 40 | 65 | 33 | 20 | 20 | 22 |
| Selections from primary texts | 56 | 50 | 68 | 63 | 58 | 77 | 72 | 65 | 74 | 37 | 35 | 50 |
| Secondary sources | 68 | 73 | 59 | 73 | 75 | 69 | 90 | 100 | 88 | 79 | 77 | 89 |
| Write critical papers | 63 | 60 | 68 | 60 | 52 | 81 | 72 | 65 | 74 | 54 | 53 | 61 |
| Original research | 17 | 14 | 20 | 17 | 10 | 38 | 25 | 22 | 26 | 8 | 8 | 11 |

## TABLE 12—Institutions Requiring Formal Library Training for All Undergraduates, 1984–85

(Percentage of Institutions)

| Training Type | Doctorate |  |  | Comprehensive |  |  | Baccalaureate |  |  | Two-year |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  | Total (N = 163) | Public (N = 104) | Private (N = 59) | Total (N = 399) | Public (N = 252) | Private (N = 147) | Total (N = 708) | Public (N = 119) | Private (N = 589) | Total (N = 1,296) | Public (N = 940) | Private (N = 356) |
| Formal training required | 22 | 20 | 24 | 32 | 30 | 35 | 56 | 50 | 57 | 36 | 30 | 52 |
| Orientation | 16 | 14 | 20 | 26 | 24 | 29 | 53 | 43 | 56 | 34 | 29 | 47 |
| Intensive training | 3 | 2 | 4 | 14 | 13 | 17 | 26 | 7 | 29 | 12 | 10 | 18 |
| Other | 4 | 7 | 0 | 4 | 4 | 4 | 7 | 14 | 6 | 2 | 2 | 3 |

## TABLE 13—Institutions Reporting the Use of Various Approaches to the Teaching of Expository Writing, 1984–85

(Percentage of Institutions)

| | Doctorate | | | Comprehensive | | | Baccalaureate | | | Two-year | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total (N = 163) | Public (N = 104) | Private (N = 59) | Total (N = 399) | Public (N = 252) | Private (N = 147) | Total (N = 708) | Public (N = 119) | Private (N = 589) | Total (N = 1,296) | Public (N = 940) | Private (N = 356) |
| English department only | 42 | 41 | 44 | 46 | 48 | 44 | 47 | 64 | 43 | 57 | 64 | 37 |
| Composition program | 68 | 73 | 60 | 72 | 75 | 67 | 57 | 57 | 56 | 50 | 53 | 42 |
| Writing laboratory | 61 | 70 | 44 | 66 | 74 | 52 | 49 | 86 | 41 | 48 | 55 | 29 |
| Peer tutorial | 22 | 30 | 8 | 41 | 39 | 45 | 31 | 43 | 29 | 21 | 25 | 10 |
| Across the curriculum | 36 | 30 | 48 | 43 | 37 | 52 | 43 | 29 | 46 | 34 | 24 | 61 |
| Designated amount of critical writing | 47 | 50 | 41 | 35 | 29 | 46 | 44 | 15 | 50 | 44 | 36 | 66 |
| Proficiency examination | 28 | 32 | 20 | 34 | 41 | 22 | 25 | 14 | 28 | 25 | 25 | 26 |
| Optional thesis | 68 | 70 | 64 | 48 | 38 | 64 | 52 | 14 | 59 | 2 | 3 | 0 |
| Mandatory senior thesis | 3 | 0 | 8 | 1 | 1 | 1 | 10 | 0 | 12 | 1 | 2 | 0 |

## TABLE 14—Institutions Reporting Restructuring of General Education Requirements, 1984–85

(Percentage of Institutions)

| | Doctorate | | | Comprehensive | | | Baccalaureate | | | Two-year | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total (N = 163) | Public (N = 104) | Private (N = 59) | Total (N = 399) | Public (N = 252) | Private (N = 147) | Total (N = 708) | Public (N = 119) | Private (N = 589) | Total (N = 1,296) | Public (N = 940) | Private (N = 356) |
| Not being considered | 39 | 33 | 49 | 42 | 40 | 46 | 48 | 36 | 50 | 52 | 53 | 50 |
| In planning stage | 34 | 35 | 32 | 30 | 25 | 39 | 25 | 36 | 23 | 22 | 23 | 18 |
| In process | 23 | 30 | 12 | 21 | 27 | 10 | 18 | 14 | 19 | 21 | 16 | 32 |
| Just completed | 4 | 2 | 8 | 6 | 8 | 4 | 8 | 14 | 7 | 5 | 7 | 0 |

## TABLE 14.1—Institutions Reporting Restructuring of General Education Requirements, by Initiator, 1984–85

(Percentage of Institutions)

| | Doctorate | | | Comprehensive | | | Baccalaureate | | | Two-year | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total (N = 102) | Public (N = 69) | Private (N = 33) | Total (N = 219) | Public (N = 134) | Private (N = 85) | Total (N = 361) | Public (N = 68) | Private (N = 293) | Total (N = 585) | Public (N = 397) | Private (N = 188) |
| Faculty committee | 28 | 28 | 29 | 44 | 39 | 52 | 37 | 25 | 39 | 42 | 46 | 35 |
| Faculty senate | 7 | 10 | 0 | 12 | 14 | 8 | 2 | 0 | 3 | 0 | 0 | 0 |
| Dean | 30 | 31 | 29 | 20 | 10 | 35 | 42 | 38 | 44 | 37 | 26 | 60 |
| President | 5 | 3 | 7 | 18 | 26 | 5 | 9 | 25 | 5 | 5 | 8 | 0 |
| Other | 30 | 28 | 36 | 7 | 11 | 0 | 10 | 12 | 9 | 16 | 21 | 5 |

Note: Percentage based on institutions reporting a restructuring of requirements.

# APPENDIX A: SURVEY INSTRUMENT

AMERICAN COUNCIL ON EDUCATION
Higher Education Panel

July 11, 1984

Dear Higher Education Panel Representative:

Attached is Higher Education Panel Survey No. 66, "General Education Requirements in the Humanities." It is sponsored by the National Endowment for the Humanities for the purpose of determining the status of undergraduate general education requirements in the humanities at colleges and universities throughout the country.

In recent years, some observers of higher education have perceived a decline in the importance of the humanities in general education. The Endowment is seeking to assess this trend and to strengthen the teaching and learning of the humanities at the undergraduate level. This survey will aid the Endowment by providing reliable data that are needed to develop effective program policies, guidelines, and priorities.

This survey may be most appropriately completed by the dean of undergraduate education at larger institutions or by the dean of the college at smaller institutions. However, we rely on your determination of the most appropriate respondent.

Please understand that your institution's response will be protected to the maximum extent permissible by law. As with all our surveys, the data you provide will be reported in summary fashion only and will not be identifiable with your institution. This survey is authorized by the National Science Foundation Act of 1950, as amended. Although you are not required to respond, your cooperation is needed to make the results comprehensive, reliable, and timely.

Please have the completed questionnaire returned to us by **August 1,** enclosed in the postpaid, preaddressed envelope.

If you have any problems or questions, please do not hesitate to telephone us collect at (202) 833-4757. Thank you for your assistance.

Sincerely,

Frank J. Atelsek

Frank J. Atelsek
Panel Director

Enclosure

AMERICAN
COUNCIL ON
EDUCATION

OMB # 3145-0009
Exp. 03/31/87

Higher Education Panel Survey #66

# GENERAL EDUCATION REQUIREMENTS IN THE HUMANITIES

## NOTE

For the purposes of this questionnaire, "general education" is defined as that part of the curriculum that all undergraduates are required to take, regardless of major, in order to graduate. Often referred to as the "breadth" of component of the curriculum, general education is distinct from the "depth" major, and from free electives. Some institutions require students to take a specific set or "core" of general education courses. Other institutions adopt a distribution scheme whereby students can select from groups of courses to complete the general education requirements.

All questions refer to requirements in effect for students entering in the 1984–85 academic year unless otherwise indicated. Humanities includes modern and classical languages; linguistics; English; literature; history; American studies; philosophy; archaeology; religious studies; and the history, criticism, and theory of the arts.

**If your institution does not have an undergraduate program, please check the box ☐ and return the questionnaire uncompleted to us.**

1. Are there any course requirements that all undergraduate degree candidates must meet to graduate, regardless of major?
   ____ Yes. Proceed to question 2.
   ____ No. Skip to question 9.

2. Please indicate which of the following conditions describes your current general education requirements and whether they existed during the 1979–80 academic year. Check *all* that apply.

| | Part of 1984–85 Requirements | Part of 1979–80 Requirements |
|---|---|---|
| a. Students must take one or more specified departmental courses, e.g., "history 101." | ___ Yes ___ No | ___ Yes ___ No |
| b. Students must take one or more specified interdisciplinary or interdepartmental courses. | ___ Yes ___ No | ___ Yes ___ No |
| c. Students must choose from a limited range of courses to fulfill area requirements. | ___ Yes ___ No | ___ Yes ___ No |
| d. Students must choose from a virtually unlimited range of courses to fulfill area requirements. | ___ Yes ___ No | ___ Yes ___ No |

3. Please indicate during which years students usually complete the general education requirements.

| | 1984–85 | 1979–80 |
|---|---|---|
| Lower division only | ______ | ______ |
| Upper division only | ______ | ______ |
| Upper and/or lower division | ______ | ______ |

4. Indicate the minimum number of credit hours required of general education and the *total* number of hours required for graduation from the:

| (a) **Four-year baccalaureate program** (check here ☐ if not applicable) | 1984–85 | 1979–80 |
|---|---|---|
| Required only in general education: | ___ hours | ___ hours |
| Total required for graduation: | ___ hours | ___ hours |
| (b) **Two-year associate program** (check here ☐ if not applicable) | | |
| Required only in general education: | ___ hours | ___ hours |
| Total required for graduation: | ___ hours | ___ hours |

| (c) Indicate whether these totals are based on a quarter or semester system. | 1984–85 | 1979–80 |
|---|---|---|
| Quarter | ______ | ______ |
| Semester | ______ | ______ |
| Other (specify): | ______ | ______ |

______________________

**The following questions should be answered for four-year programs whenever possible. If your institution offers only a two-year program, then provide responses for the two-year program.**

5. For each of the following academic areas, indicate the minimum number of credit hours (either quarter or semester) required of all degree candidates entering in 1984–85 and in 1979–80.

| **The humanities:** | Credit Hour Requirements 1984–85 | Credit Hour Requirements 1979–1980 |
|---|---|---|
| a. English composition | | |
| b. English or American literature | | |
| c. Foreign languages and literature | | |
| d. World or Western civilization | | |
| e. Other history | | |
| f. Philosophy | | |
| g. Classics | | |

| | Credit Hour Requirements 1984–85 | Credit Hour Requirements 1979–1980 |
|---|---|---|
| h. Other humanities fields,* including interdisciplinary humanities courses | | |
| Other fields: | | |
| i. Studio and performing arts | | |
| j. Social sciences | | |
| k. Mathematics | | |
| l. Natural and physical sciences | | |

6. In order to graduate, *must* a student take one or more courses that include substantial content in:

Ancient or medieval European history ____ Yes ____ No

European history from the Renaissance ____ Yes ____ No

American history and literature ____ Yes ____ No

Literature and philosophy of ancient Greece and Rome ____ Yes ____ No

Literature, history, or cultures of Africa or Asia ____ Yes ____ No

7. Which of the following best describe your institution's foreign language graduation requirement for all undergraduates? Check *all* that apply.

☐ There are no foreign language requirements of any kind.
☐ A specified number of courses or hours are required.
☐ A language proficiency examination must be passed.
☐ Computer courses may be substituted for foreign language courses.
☐ Other courses may be substituted for foreign language courses (specify): ____
☐ Other foreign language requirement (specify): ____

8. How many humanities courses taken to fulfill general education requirements demand that students:

| | Two-thirds or More Courses | Between One-third and Two-thirds Courses | One-third or Fewer Courses or None | Do Not Know |
|---|---|---|---|---|
| (a) Read primary literary, historical, or critical texts in their entirety | | | | |
| (b) Read selections from primary literary, historical, or critical texts | | | | |
| (c) Read textbooks and other secondary sources | | | | |
| (d) Write critical papers | | | | |
| (e) Conduct original research from primary sources | | | | |

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*Linguistics, art history, music history, archaeology, jurisprudence, and religious studies and ethics, as well as interdisciplinary courses whose content is primarily the humanities.

**THE QUESTIONNAIRE IS CONTINUED ON THE FOLLOWING PAGE.**

9. Are all undergraduate students required to take formal training in the use of the college library for research?

_______ Yes _______ No

If yes, which of the following describe the required training? Check *all* that apply.

☐ Orientation by the library staff

☐ More intensive training in the use of library resources involving faculty

☐ Other (specify) ____________________

10. Which of the following describe your approach to the teaching of expository writing skills to undergraduates? Check *all* that apply

Writing is taught only in the English department. _____ Yes _____ No

Writing is taught in a special composition program. _____ Yes _____ No

Writing is taught in a writing laboratory. _____ Yes _____ No

Writing is taught using a peer tutorial system _____ Yes _____ No

Writing is taught in a "writing across the curriculum" program, i.e., in all or most academic departments. _____ Yes _____ No

Students are responsible for a designated amount of critical writing in the general education courses. _____ Yes _____ No

Students must pass a writing proficiency examination. _____ Yes _____ No

Students *may* write a senior thesis. _____ Yes _____ No

Students *must* write a senior thesis. _____ Yes _____ No

11. Is your institution currently restructuring or planning to restructure the general education requirements? (Check only one.)

(a) No, not under active consideration ____________

(b) Yes, restructuring is in active planning stage ____________

(c) Yes, restructuring is in process ____________

If you checked "b" or "c," who within your institution was the principal initiator of the restructuring? (Check only one.)

☐ Faculty committee

☐ Faculty senate

☐ Dean

☐ President

☐ Other (specify) ____________________

---

Thank you for your assistance. Please return this form by **August 1** to:

Higher Education Panel
American Council on Education
One Dupont Circle, Suite 829
Washington, DC 20036

Please keep a copy of this survey for your records.

Person completing form:

Name ____________________

Title ____________________

Telephone (______) ____________________

If you have any questions or problems concerning this survey, please call the HEP staff collect at (202) 833-4757.

# APPENDIX B: TECHNICAL NOTES

Questionnaires were sent to 445 universities, four-year institutions, and two-year colleges from one of the Panel's 520-institution half-samples. Excluded from the survey were institutions offering only graduate and/or first-professional degrees, such as those in medicine, the allied health professions, law, theology, business, and the studio and performing arts. Responses were received from 372 of the institutions survyed for an overall response rate of 84 percent. Table B-1 shows the stratification design, the population, and the number of responses.

## Comparison of Respondents and Nonrespondents

Respondent institutions are compared with Panel nonrespondents against several characteristics in table B-2. Generally, the larger institutions (with undergraduate full-time enrollment of 10,000 students or more) showed a relatively high response rate (90 percent). Universities overall and public universities in particular had high response rates (87 and 88 percent, respectively), as did institutions in the South (89 percent). Institutions showing relatively low response rates were the two-year colleges (78 percent), especially the private two-year colleges (72 percent), and institutions in the West (76 percent).

TABLE B-2—Comparison of Respondents and Nonrespondents

(In Percentages)

| Characteristic | Respondents (N = 372) | Non-Respondents (N = 73) | Response Rate |
|---|---|---|---|
| Total | 100.0 | 100.0 | 84 |
| **Control** | | | |
| Public | 66 | 68 | 83 |
| Private | 34 | 32 | 85 |
| **Type** | | | |
| Universities | 18 | 14 | 87 |
| Four-year colleges | 46 | 37 | 86 |
| Two-year colleges | 35 | 50 | 78 |
| **Control and Type** | | | |
| Public universities | 12 | 8 | 88 |
| Private universities | 7 | 6 | 86 |
| Public four-year colleges | 24 | 20 | 86 |
| Private four-year colleges | 22 | 16 | 87 |
| Public two-year colleges | 30 | 40 | 80 |
| Private two-year colleges | 5 | 10 | 72 |
| **Region** | | | |
| Northeast | 22 | 25 | 82 |
| Midwest | 26 | 23 | 85 |
| South | 34 | 22 | 89 |
| West | 18 | 30 | 76 |
| **Undergraduate FTE Enrollment** | | | |
| Less than 2,000 | 34 | 36 | 83 |
| 2,000–5,999 | 30 | 33 | 82 |
| 5,000–9,999 | 18 | 20 | 82 |
| 10,000 or more | 18 | 11 | 90 |

TABLE B-1—Stratification Design

| Cell | | Population (N = 2,566) | Respondents (N = 372) |
|---|---|---|---|
| 01 | Public doctoral universities, FTE 9,000+ | 104 | 44 |
| 02 | Private doctoral universities, FTE 9,000+ | 61 | 25 |
| 03 | Public comprehensive, FTE 9,000+ | 92 | 38 |
| 04 | Private comprehensive, FTE 9,000+ | 27 | 12 |
| 07 | Public two-year academic/occupational, FTE 9,000+ | 43 | 15 |
| 08 | Public comprehensive, FTE 5,500–8,999 | 56 | 17 |
| 09 | Public comprehensive, FTE<5,500 | 108 | 20 |
| 10 | Private comprehensive, FTE<9,000 | 126 | 19 |
| 11 | Public baccalaureate, FTE<9,000 | 127 | 14 |
| 12 | Private baccalaureate, FTE 1,350–8,999 | 166 | 21 |
| 13 | Private baccalaureate, FTE<1,350 | 446 | 31 |
| 17 | Public two-year academic/comprehensive, FTE 6,000–8,999 | 55 | 14 |
| 18 | Public two-year academic/comprehensive, FTE 4,000–5,999 | 72 | 16 |
| 19 | Public two-year academic/comprehensive, FTE 2,000–3,999 | 155 | 18 |
| 20 | Public two-year academic/comprehensive, FTE<2,000 | 333 | 21 |
| 21 | Private two-year academic/comprehensive, FTE<9,000 | 129 | 13 |
| 22 | Public two-year occupational, FTE 2,500–8,999 | 63 | 11 |
| 23 | Public two-year occupational, FTE<2,500 | 221 | 18 |
| 24 | Private two-year occupational, FTE<9,000 | 240 | 5 |

## Reliability of Survey Estimates

The figures in this survey are estimates based on a sample designed to yield information for an entire population. Were a census of the population to be taken, using the same survey instrument, instructions, and procedures as those used in this survey, the resulting figures would be somewhat different. The results are also subject to reporting and processing errors and errors due to nonresponse. To the extent possible, these types of errors were kept to a minimum by methods built into the survey procedures.

A means of gauging the accuracy of these estimates is the use of the standard error, which is primarily a measure of sampling variability—the variations that might occur by chance because only a sample of institutions is surveyed. The chances are about 68 out of 100 that an estimate from the sample would differ from a complete census by less than the standard error. The chances are about 90 out of 100 that it would be less than 1.65 times the standard error and 99 out of 100 that it would be less than 2.5 times as large. Knowledge of the standard error permits researchers to specify, by a stated confidence, a range within which a given estimate would lie if a complete census, rather than a sample survey, had been conducted.

For example, the estimated number of credit hours of general education required by four-year bachelor's programs in 1984–85 was 45 hours. Table B-3 shows that the confidence limit at the 90 percent level of confidence is ± 1.3 hours. Thus, chances are about 90 out of 100 that a complete census would show the number of general education credit hours at all four-year institutions to be more than 43.7 and less than 46.3.

Table B-3 shows the 90 percent confidence intervals of selected survey estimates.

**TABLE B–3—Ninety Percent Confidence Intervals (+ or −) of Selected Survey Estimates**

(In Hours)

| Credit Hours | 1984–85 | 1979–80 | 1984–85 | 1979–80 | 1984–85 | 1979–80 |
|---|---|---|---|---|---|---|
| Four-year bachelor's program | | | | | | |
| General education only | 1.3 | 1.6 | 1.5 | 1.7 | 1.8 | 2.4 |
| Graduation total | 1.5 | 1.3 | 0.5 | 0.5 | 2.4 | 2.0 |
| Two-year program | | | | | | |
| General education only | 1.6 | 1.7 | 1.7 | 1.8 | 3.0 | 3.3 |
| Graduation total | 0.9 | 1.2 | 0.7 | 1.5 | 1.9 | 1.9 |
| English composition | 0.2 | 0.3 | 0.3 | 0.3 | 0.4 | 0.4 |
| English/American literature | 0.2 | 0.2 | 0.2 | 0.3 | 0.4 | 0.4 |
| Foreign language | 0.2 | 0.2 | 0.2 | 0.2 | 0.5 | 0.5 |
| World civilization | 0.2 | 0.2 | 0.2 | 0.2 | 0.4 | 0.3 |
| Philosophy | 0.2 | 0.2 | 0.1 | 0.04 | 0.6 | 0.6 |
| Classics | 0.04 | 0.04 | 0.04 | 0.02 | 0.1 | 0.1 |

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